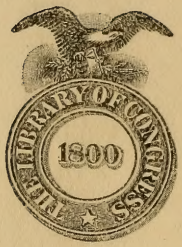

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THE MARKETING OF WHOLE MILK

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THE MARKETING OF WHOLE MILK

BY

HENRY E. ERDMAN PH.D.

ASSISTANT PROFESSOR OF RURAL ECONOMICS, OHIO STATE UNIVERSITY

New York

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Set up and electrotyped. Published June, 1921.

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AUTHOR'S PREFACE

Milk is a food in the distribution of which the public has taken particular interest, and on which much has been said and written. Numerous investigations have been made and reports issued upon the subject. The author has made a careful study of all such material available, in order to supplement information gained from a number of years of personal contact with the milk business in various parts of the country, and has attempted here to present a rounded out discussion of some of the economic phases of milk distribution and of the ever present problem of price determination. It is hoped that such a presentation may aid in clearing the air of much that is beside the point or even in error and may give a clearer conception of the whole problem to those who are called upon to solve it.

Acknowledgment should be made for the assistance rendered by a large number of milk dealers, by officers of milk producers' associations, by public officials, and by some of my fellow teachers. Special acknowledgment is due to Professor B. H. Hibbard, of the University of Wisconsin, and to Professor J. I. Falconer, of Ohio State University, who very carefully read the manuscript and gave helpful suggestions.

H. E. Erdman.

Columbus, Ohio,
April 29, 1921.

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THE MARKETING OF WHOLE MILK

THE MARKETING OF WHOLE MILK

CHAPTER I

INTRODUCTORY SKETCH

THE milk problem has arisen largely as a result of the complex nature of our modern civilization. In less advanced countries there is practically no such question, because, in the first place, backward peoples use less milk than enlightened peoples, and in the second place each family group is to a much larger extent self-sufficing.

Milk distribution does not become a real problem until producer and consumer are somewhat widely separated. In the early history of all of our large cities many of the inhabitants "kept a cow," a practice followed to this day in many sections, especially in the smaller cities and towns. Other consumers procured their milk supply from a neighbor who had a cow, and still others patronized the milkman —a producer who drove into the city from his farm morning and evening with his cans of milk, frequently announcing his presence by means of a bell or whistle.[1] Upon his arrival the housewife went to his wagon with some convenient vessel to get her milk. Sometimes the milkman followed a more or less regular route, stopping here and there

[1] Harbison, Thos. B., *Milk and Its Distribution in Philadelphia* (1917), p. 1.

at the homes of persons considered as customers, often carrying into the house a small pail of milk with a spout for pouring.[1]

As cities grew, more and more of the dairymen found that it took too long to peddle milk in the city in addition to making the long drive to and from town. Gradually, therefore, the practice became common for some man in the city to buy milk of the producer and deliver it to the consumer, and thus leave the farmer free for his farm work. Also various shopkeepers were found who agreed to handle milk and sell it at a slight gain to such persons as needed an extra supply or as had missed the milkman.

Until about 1842 all New York milk was hauled into the city by wagon. In 1842 the first rail shipments of milk were made into New York City from Chester, Orange County, New York, and during the summer of that year about 45 cans were shipped daily. During the next year the daily average reached 275 cans.[2] In October, 1917, New York received milk from 30,934 farms located in six states and Canada.[3] Philadelphia obtains milk from as far as points near Rochester and Buffalo, New York.[4] Pittsburg, Cleveland, and Chicago all get milk from widely scattered territory. In each case producers and consumers are brought together by means of middlemen after a delay of many hours. This wide separation of producer and consumer, as related to several other factors, gives rise to difficult problems. Chief among these factors are the following conditions:

[1] The writer found numerous instances of this practice in small towns of Wisconsin in the summer of 1916.

[2] Van Wagenen, J., Jr., *Country Gentleman*, June 1, 1912, p. 7.

[3] *Report of the Mayor's Committee on Milk*, Dec., 1917, p. 16.

[4] Harbison, Thos. B., *Milk and Its Distribution in Philadelphia*, p. 1, 1917.

1. Milk occupies an unique and important place in our diet.

2. Milk is an extremely perishable product.

3. The nature of the product and the conditions of its production and distribution are such that supply and demand are not easily or quickly adjustable.

CHAPTER II

MILK AS A MARKET COMMODITY

Section 1. Some Comparisons

THE United States Bureau of Markets has made the estimate that a total of 87,905,512,800 pounds of milk was produced in the United States in 1918. Of this, it further estimated, 44.25 per cent was consumed as fluid milk.[1] Figuring the food value of milk at 307 calories per pound and the food value of potatoes at 303.4 calories per pound (figures used in *Illinois Experiment Station Circular* 235, pp. 5 and 18), the food value of the fluid milk consumed in 1918 was 60 per cent greater than that of the entire potato crop of the same year.[2] On a basis of money value, figuring the value of milk at $2.80 per hundred [3] and taking the average price of wheat and potatoes as given by the Department of Agriculture for December 1, 1918, we have the following comparison of values:

Fluid milk consumed 1918	$1,089,200,000
Potato crop of 1918	478,136,000
Wheat crop of 1918	1,874,623,000

How the total of over eighty-seven billion pounds of milk was utilized has been estimated by the Bureau of Markets as follows: [4]

[1] *Hoard's Dairyman*, May 23, 1919, p. 916.
[2] See *Year Book*, Department of Agriculture, 1918.
[3] *Hoard's Dairyman*, May 23, 1919.
[4] *Hoard's Dairyman*, May 23, 1919.

TABLE I

Tentative Statement by U. S. Bureau of Markets for Year 1918 of Amount and Percentage of Milk Used in the Primary Manufacture of Dairy Products and for Other Purposes, Based Upon the Most Reliable Sources of Information Available

Number of milk cows on farms, January 1, 1918	23,310,000
Number of milk cows in towns and cities, January 1, 1918	1,500,000
Total number of milk cows	24,810,000
Average number of dairy cows not producing milk during the year	2,481,000
Net number of cows producing milk on farms and in towns and cities	22,329,000

Item	*Pounds of milk*	*Percentage of total*
Production of 22,329,000 dairy cows at 3,936.8 lbs. per cow	87,905,512,800	
Disposition of product:		
800,000,000 pounds creamery butter (at 21 lbs. milk)	16,800,000,000	19.10
710,000,000 pounds dairy butter (at 21 lbs. milk)	14,910,000,000	16.91
400,000,000 pounds cheese (at 10 lbs. milk)	4,000,000,000	4.45
1,600,000,000 pounds condensed milk (at 2½ lbs. milk)	4,000,000,000	4.45
220,000,000 gallons ice cream (weighing 6 lbs. to the gal. 10% fat)	3,300,000,000	3.75
5,000,000 pounds powdered milk (at 8 lbs. milk)	40,000,000	.04
16,000,000 pounds malted milk (at ¼ lb. milk)	4,000,000	.004
6,000,000 pounds sterilized milk (canned)	6,000,000	.006
105,000,000 persons; 45% at 0.7 pound a day (cities); farms with dairy cows, 30%, 1.5 lbs. per day; other farms and small towns, 25%, 1 lb. a day, approximately	38,899,875,000	44.25
17,848,000 dairy calves (estimated) requirement of whole milk	3,748,000,000	4.26
Losses on farms and factories—about 2½%	2,197,637,800	2.50
Total	87,905,512,800	100.00

This statement is expressed in round numbers, and the figures in most instances are estimates.

Elaborating on the above table as it applies to the 38,899,875,000 pounds consumed as fluid milk, we have the following:

TABLE II

Where consumed	*No. of persons*	*% of total population*	*Estimated consumption per capita daily*	*Pounds consumed daily*	*% of total daily fluid consumption*
On farms with dairy cows..	31,500,000	30	1.5 lbs.	47,250,000	44.34
In small towns and on farms with no dairy cows .	26,250,000	25	1.0 lb.	26,250,000	24.63
In cities.....	47,250,000	45	.7 lb.	33,075,000	31.03
	105,000,000	100			100.00

On the basis of this estimate 44.34 per cent of the fluid milk is consumed on the farms producing it and does not enter into commerce at all. In small towns and on farms having no dairy cows, 24.63 per cent is consumed; in which instance there is no marketing problem, for the milk is obtained either from a neighbor or from some producing milkman who makes daily personal visits directly to the consumer. It is, then, only the 31.03 per cent consumed in our cities which is the object of so much contention; and this 31.03 per cent of the milk consumed in fluid form constitutes only 13.73 per cent of the total production of 87,905,512,000 pounds.

Section 2. Peculiar Place of Milk in Our List of Wants

One of the principal reasons why the milk question has been so prominently before the public is the fact that milk occupies a peculiar place in our list of wants. Its

composition is such that it is the ideal food for the young. It has been estimated that two-thirds of the American children under one year of age are compelled to live on milk.[1] Whether the number is actually as large as this or not is immaterial. It is undoubtedly very great, great enough to mean that milk is an absolute necessity in at least several million homes. Even children who are breast-fed and older children use considerable milk, and a great many adults use it regularly as a beverage. As one of the chief ingredients needed in cooking it is indispensable.

The importance of milk in the diet has been thus stated by the Committee on Nutritional Problems of the Food and Drug Section, American Public Health Association, in its report of October 14, 1918: "A liberal use of milk in the diet is the best safeguard against any deficiency which might possibly arise through restricted choice of foods."[2] The necessity for milk in the diet of growing children has been emphasized by the studies and experiments of Dr. E. V. McCullom concerning the influence of milk and the butterfat which it contains on the growth of young animals.[3]

Just how much milk is consumed in a given locality either as a drink or for culinary purposes is hard to determine. In 1916 the writer made rather careful estimates as to the consumption in several Wisconsin cities and towns. The results are shown in Table III.[4]

[1] Washburn, Prof. R. M., *Milk Magazine*, Sept., 1919, p. 19.

[2] Mumford, H. W., and Wilcox, Roy H., *Jour. of Farm Economics*, Oct., 1919, p. 117.

[3] *Hoard's Dairyman*, Dec. 19, 1919, p. 1033.

[4] Wis. Agr. Exp. Sta. Bul. 285, p. 5.

TABLE III

Per Capita Consumption of Whole Milk

City	*Estimated population July 1, 1916 (By U. S. Census)*	*Total estimated daily consumption—pints*	*Pints consumed daily per capita*
Milwaukee	436,535	265,319	.608
Oshkosh	36,065	16,060	.445
Green Bay	29,353	12,649	.431
Eau Claire	18,807	9,354	.497
Beloit	18,072	11,550	.639
Monticello [1]	680	380	.559
Belleville [1]	480	266	.554

In 1914 the Dairy Division of the United States Department of Agriculture made a survey in which it attempted to ascertain the daily per capita consumption of milk in various parts of the country.[2] The results of this survey appear in the following table:

TABLE IV

Milk Consumption and Milk Prices by Geographic Divisions

Geographic division	*Daily consumption*		*Average price*	
	No. of cities reporting	*Pints per capita*	*Cities reporting*	*Price per qt.—cents*
New England	59	.7252	76	8.50
East North Central	64	.7193	92	7.78
West North Central	27	.7152	37	8.23
Middle Atlantic	73	.6961	104	8.07
Pacific	29	.5632	37	9.39
Mountain	9	.5088	15	8.76
South Atlantic	33	.4256	44	10.20
West South Central	16	.3952	22	9.93
East South Central	9	.3080	15	9.61
Average or total	319	.6504	442	8.59

[1] Population estimated by the writer.

[2] Address of L. B. Cook, of Dairy Division before International Association of Dairy & Milk Inspectors, 1916, reprinted in Annual Report, pp. 281–283.

It is interesting to note that the per capita consumption in general is largest in the northern and eastern parts of the country, where dairying is well developed, and lowest in the south and west, where dairying is more or less backward and where prices are highest.

The coming of prohibition is leading to a wider use of milk as a beverage among working men in our industial centers, and this use will undoubtedly become more general as milk is made more readily available at all times. Many milk distributors at present provide for the delivery of milk to workmen in pint or half pint bottles at the noon hour.

Demand for milk can undoubtedly be greatly increased by judicious publicity and advertising. Most of the advertising hitherto has been done by rival distributors whose arguments have sought to show that the milk of each particular dealer was pure and uncontaminated and that mothers might give that specific milk to their children without fear of conveying deadly disease. Such adver-vertising undoubtedly sold the product of one dealer at the expense of the others, but at the same time it raised doubt in the minds of consumers as to the sanitary quality of all milk. This sort of advertising is not unlike that of a whisky dealer who proclaimed his brand of goods as "the whisky without a headache," little realizing that in calling attention to the fact that most whisky does produce a headache, he was putting not only others but himself out of business.[1]

Constructive advertising is needed--the kind, for example, that suggests specific ways for using milk. Dairymen can well learn a lesson from some of the western fruit growers. The latter have published recipes for preparing

[1] Editorial, *Tobacco Leaf*, Jan. 8, 1920, p. 4.

tempting dishes which call for their product as the principal ingredient. These recipes are accompanied by most attractively colored illustrations.[1] Some constructive advertising, as a matter of fact, is now being done to increase the use of milk. A campaign under way in Iowa, aiming to teach school children the high food value of the product, is resulting in a substantial increase in consumption. The children are urged to use milk as a part of the noonday lunch. The increase in some places is estimated to be as high as from ten to twenty-five per cent.

As regards the consumption of condensed and powdered milk there are tremendous possibilities for expansion. The United States Department of Agriculture estimates that the daily per capita consumption of condensed milk is but 0.49 ounce and of powdered milk 0.012 ounce.[2]

Section 3. Regularity of Production and Consumption

Milk as a market commodity differs from most other commodities in the regularity with which it is produced and consumed. Milk production is a regular, every-day job. There is no let-up for Sundays or holidays. Even a "strike" does not hinder production—it may mean destruction of part of the product for the period of the strike, but to leave cows unmilked for one day might cause irreparable damage. Consequently production must be continued at nearly full speed or be entirely discontinued for the better part of a year at least.

Consumption likewise is quite regular. In the use of milk as a food for very young children and as a part of customary breakfast dishes, consumption is regular and

[1] See advertising pages of *Ladies' Home Journal, Saturday Evening Post,* and *Pictorial Review* during 1918 and 1919.

[2] *Weekly News Letter,* Nov. 19, 1919, p. 5.

almost constant. Because of its perishability and because there is no adequate substitute for milk for these purposes it happens that it reaches the consumer regularly very soon after its production. A survey made by a committee of the International Association of Dairy and Milk Inspectors in the summer of 1916 shows that the total age of milk when delivered to the consumer in a considerable number of cities averaged as follows: [1]

TABLE V

	Maximum	*Minimum*	*Average*
Night's milk	25 hrs.	12 hrs.	16 hrs.
Morning's milk	16 hrs.	5 hrs.	9½ hrs.

These estimates, however, obviously include milk delivered directly by the producer himself. Around our larger cities the time is usually longer, generally from thirty-six to fifty hours for the evening's milk and from twenty-four to thirty-eight hours for the morning's milk. For example, in the case of such cities as Columbus, Ohio, Akron, Ohio, and Milwaukee, Wisconsin, where most or all of the milk goes right to the city plants of the dealers, the various steps follow each other about as follows: Starting at the time the milking is about completed, at five P. M. on Sunday, let us say, the milk is put into cooling tanks in cans. Monday morning at about the same hour the morning's milking is completed and the milk started on its way, reaching the city plant about mid-day. During the afternoon it is processed, bottled, and placed in the refrigerator. Early Tuesday morning, usually between one A. M. and four A. M., it is loaded on

[1] International Association of Dairy & Milk Inspectors, *5th Annual Report*, 1916, p. 49.

wagons and sent on its way toward the homes of the consumers, where it is delivered sometime during the forenoon of that day. A part of it, however, is delivered to stores, in which case the consumers get it sometime during the day or even the following morning (Wednesday). The major portion of the evening's milk in these instances is not over forty hours old; the morning's milk is about twenty-eight hours old. The age is not much different in the case of very large cities, where the milk is received and bottled at country plants. The principal difference is that the milk is hauled to the city in refrigerator cars during the late afternoon or evening of the day on which the morning's milk leaves the farm of the producer.[1]

Contrast this with butter, which is often held for eight or ten months before being consumed, or with cheese, which is held even longer. Perishable fruits and vegetables are of course also marketed in as short a time as possible after production, and the consumer doubtless receives those products which are grown near our large cities within twenty-four or forty-eight hours of the time the producer starts them on the road to the city. Large quantities of these perishables, however, are now brought to our cities from distant producing centers. In such cases a week or more often elapses between production and consumption. The less perishable fruits and vegetables,—citrus fruits, apples, potatoes,—are often stored during the better part of a year. As regards some of the non-food products the period between production and consumption of the raw material is very much extended. Wool, for instance, often takes the better part of a year to move from producer to manufacturer; another year is

[1] Milk Dealer's Letter No. 7, Sept., 1914, U. S. Dept. of Agr.; Wisconsin Bul. 285, *Marketing Wisconsin Milk*, p. 28.

likely to elapse before the manufactured clothing is placed in the hands of the consumer.

There is, of course, an exception in the case of condensed, evaporated, and powdered milks. These are often stored for considerable periods and later used for many of the purposes for which fluid milk is ordinarily used. As a matter of fact, the perfection of these processes may in the future make possible and bring about greater irregularity both in the production and consumption of milk.

Section 4. Milk Distribution Affected with a Public Interest

Milk as a market commodity has been hampered by numerous restrictions for many years both in its production and in its distribution. Dairymen have been compelled to remodel their barns to conform to certain specifications; peddlers are compelled to deliver their milk in expensive bottles instead of by the cheaper bulk method; city dealers have had to install high-priced pasteurizing machinery in their plants. These and other restrictions have been placed in the name of the public interest. Recently a number of investigational committees have recommended that the distribution of milk be declared a public service. Such was the recommendation of the Wicks Committee in New York in 1916[1] and of the Governors' Tri-State Milk Commission in Pennsylvania in 1917[2] the latter advising that the milk business be considered a "quasi-public business."

What is necessary in order that a business be affected with a public interest? In *Munn vs. Ill.*, 94 U. S. 113, Chief Justice Waite says: "When . . . one devotes his

[1] *Dairy Products, Livestock & Poultry*,—N. Y.—1917, p. 578.

[2] *Governors' Tri-State Milk Commission Report*, Harrisburg, Pa., p. 45.

property to a use in which the public has an interest, he, in effect, grants to the public an interest in that use, and must submit to be controlled by the public for the common good to the extent of the interest he has thus created. He may withdraw his grant by discontinuing the use; but, so long as he maintains the use, he must submit to the control."

Obviously the milk dealer grants to the public an interest in his business, since the business undeniably affects public welfare; first, physical welfare, that is, freedom from disease; second, economic welfare, that is, protection from the extortions of a monopoly and from the frauds of adulterators. A great amount of the literature dealing with the milk business is devoted to a consideration of its disease-carrying properties. MacNutt, for example, has brought together many compilations of statistics showing hundreds of instances of the transmission of disease germs through milk.[1] Moreover, as was shown in Section 1, milk meets a particularly essential need, a need which cannot be satisfied by means of substitutes, a need which is so important that the nation cannot afford to allow it to remain unsatisfied. The public is then vitally concerned in the handling of a food which is at once so potent a carrier of disease and such a necessity, and therefore the milk business is affected with a public interest.

It is sometimes said that if this is true of the milk business, the same must be true of the distribution of meat and of other foods. Meat and milk, to be sure, are comparable in so far as both are easily contaminated and are likely to harbor disease germs. Milk, however, is much more likely to be a germ carrier, first, because it is a better medium for the development of bacterial life; second, because

[1] MacNutt, J. S., *The Modern Milk Problem*, pp 22 to 29.

a small amount of infection will contaminate a large quantity of milk; and third, because milk is very largely consumed raw, whereas meat is almost invariably cooked before it is used. Even the sanitation of the meat supply, however, is considered of such importance that the federal government inspects all animals slaughtered at the larger slaughterhouses, particularly those which do an interstate and international business. It has been estimated that this inspection covers approximately one-half the animals slaughtered in the United States.[1]

As regards bread and similar foods, the need for rigid control is again less urgent than in the case of milk. Though such foods as a group are probably about as vital as milk, yet any one of them may be replaced with a substitute. Again, most of these foods can be stored for a longer time and hence are not produced or consumed with the same degree of regularity. Bread, for example, can be obtained from the bakery or it may be made in the home as needed. Hence the public is not so dependent upon the existence of a constant supply stream.

It would seem fair to conclude then that milk distribution is affected with a public interest to a greater degree than is the distribution of most other food products and is justly subject to such regulations as the public interest may dictate.

Leaving until a later chapter the discussion of regulations having to do with the economic aspects of the milk business, let us consider further those regulations which relate more particularly to the health problems of milk distribution.

[1] Hemenway, H. B., *American Health Protection*, p. 70.

Section 5. Health Regulations Affecting the Marketing of Milk

At the present time we are so accustomed to public regulation of the milk business that such regulation is seldom contested in the courts. "Our municipal corporations," says Dillon, "are usually invested with express powers to preserve the health and safety of the inhabitants. This is indeed one of the chief purposes of local government, and reasonable by-laws in relation thereto have always been sustained in England as within the incidental authority of corporations to ordain. In determining the validity of ordinances adopted to promote the health and comfort of the inhabitants, it may be taken as firmly established that the State possesses, and therefore municipal corporations under legislative sanction may exercise, the power to prescribe such regulations as may be reasonably necessary and appropriate for protection of public health and comfort, and that no person has an absolute right to be at all times and in all circumstances wholly free from restraint." [1]

Probably among the earliest recorded instances of milk regulation is that of the Senate of Vienna in 1599, which forbade the sale of milk, butter, and cheese for a time on account of an epidemic which was believed to have originated from dairy products.[2] A milk ordinance passed in Paris in 1743 regulating the feeding of cows and an ordinance passed in Hamburg in 1818 are other instances of early milk regulation.[3] The first law providing for dairy regulation in this country was passed in Massachusetts

[1] Dillon, *Municipal Corporations*, Vol. 2, p. 1022.
[2] *Milk Reporter*, Oct., 1919, p. 15, quoting Paul G. Heineman in *Milk*.
[3] *Ibid.*

in 1856 against the adulteration of milk by adding water.[1]

In 1859 the same state passed a law prohibiting the feeding of brewery waste to cattle and also a law calling for the appointment of inspectors and defining their duties. It was not until 1880 that the same state enacted a law fixing a minimum standard for total milk solids. Parker gives a list of seventy-seven American cities with the date of earliest inspection of dairies in each. A few of them are as follows (including most of the early instances):[2]

TABLE VI

Earliest Dairy Inspection in Various American Cities

	Earliest collections of samples	*Earliest dairy inspection*
Boston, Mass.	1859	1905
Providence, R. I.	1870	1906
Syracuse, N. Y.	1877	1907
Hartford, Conn.	1896	1908
Newark, N. J.	1885	1882
Buffalo, N. Y.	1885	....
Pittsburg, Pa.	1888	....
Philadelphia, Pa.	1890	....
Rochester, N. Y.	1891	1898
Mt. Clair, N. J.	1894	1896
New York, N. Y.	1895	1902
Washington, D. C.	1871	1895

In most instances early attempts at regulation were directed against adulteration, a practice which was widely prevalent. In 1883 about 60 per cent of Boston

[1] Kelley, Ernest, *International Institute of Dairy and Milk Inspectors*, 1915, p. 80.

[2] Parker, H. N., *City Milk Supply*, p. 371.

milk was reported to be adulterated.[1] In 1884 75 per cent of New York milk is said to have been adulterated by the addition of water and diluted by skimming.[2]

For many years, in fact until quite recently, the attitude of farmers has been one of opposition to any kind of regulation by health authorities. In 1909, for example, the attempt on the part of the city of Chicago to pass an ordinance requiring that all milk coming to the city be from tuberculin tested herds or be pasteurized resulted in the calling of a meeting of the milk producers of that section. Instead of fighting this ordinance, however, as was first proposed, this group of farmers took a rather advanced attitude for that time in adopting the slogan "Give Chicago what she wants but make her pay for it." In 1911, however, the farmers of the Chicago district succeeded in getting a law passed making it "unlawful for any city, village, incorporated town, county, or other incorporated authority, by ordinance or otherwise, to require the tuberculin test to be applied to dairy animals as a means of regulating and purifying milk, skimmed milk, cream, and other dairy products. Every such ordinance or regulation by any corporate authority other than the State of Illinois is declared void."[3] In 1914 the Milwaukee Milk Producers' Association boycotted the city of Milwaukee and withheld a large proportion of the city's milk supply during the first two weeks in July because the city insisted on requiring that all cows be tuberculin tested or the milk pasteurized.

As illustrative of the extent to which the attitude of

[1] *Country Gentleman*, Apr. 12, 1888, p. 290, quoting 29th Annual Report of the Inspector of Milk & Vinegar for the City of Boston.

[2] Wilson, Chas. S., *Ohio Farmer*, Dec. 6, 1919, p. 698.

[3] Jordan, E. O., *The Municipal Regulation of Milk Supply*, 1913.

farmers has changed on this subject is the fact that the Milwaukee Milk Producers' Association is at the present time planning to coöperate with the Board of Health in taking care of country inspection of milk and milk sources. Other progressive organizations are taking a similar attitude. The Dairymen's Co-Operative Sales Company is working with the Pittsburg health authorities, and at a meeting of the board of directiors of the New York Dairymen's League the following resolution was passed: "Resolved, That we recommend to the governor's milk committee that beginning December 1, (1919) no 'Grade C' milk will be recognized in the league contracts for sale of league milk, it being the opinion of farmers that all milk should be produced under such sanitary conditions as to enable it to be classed at the lowest as 'Class B' milk." At its annual meeting at Canton, Ohio, December, 1918, the Ohio State Grange took a stand favoring more modern methods of milk inspection and recommended the bacterial count as a means of judging quality.[1]

As has been recently stated, many producers are beginning "to recognize the economic worth of regulations first recommended for sanitary reasons."[2] Thus the more progressive dairymen consider it good business to have their cows tuberculin tested; to have light, well-ventilated barns; to use small-topped or partly covered pails; to practice prompt cooling; to sterilize milk utensils; and even to pasteurize the milk. They consider the adoption of such methods good business because it results in healthier cows, better satisfied customers, and fewer complaints.

During recent years there has been a noticeable shift

[1] *National Stockman & Farmer*, Jan. 4, 1919, p. 27.

[2] Klein, Dr. Louis, U. of Pa., in address before Pennsylvania State Medical Society, 1916.

from the stressing of mere conditions as indicative of quality to the stressing of the bacterial count, supplemented by the sediment test. The shift was given impetus by an experiment carried on in 1903 at Pennington, New Jersey, where for a whole year daily bacterial tests were made on milk produced in two barns not over one hundred feet apart on the same farm. One barn, equipped to comply with score card ideals, cost over twenty thousand dollars. The other, an old-fashioned stable with no sanitary features, cost not more than four hundred dollars. The year's results showed that the milk produced in the old barn was practically as good as that produced in the high-priced barn[1] and that the *dairyman* is more important than the *dairy*.

In 1910 the experiment was carried further on a large scale. Seventy-one dairy farmers near Homer, New York, were paid a premium for extra quality in milk as shown by bacterial tests. The farmers received instructions as to how to produce clean milk, and the results of the tests were posted with sufficient frequency to let each farmer know just where he stood. The majority of these farmers were able to produce milk containing less than ten thousand bacteria per cubic centimeter even in hot weather.[2] This experiment clearly proves that more depends upon the man and his methods than upon mere conditions.

A novel test was made near the two towns of Oxford and Kelton, Pennsylvania, in 1915. Ten Oxford dairymen who had learned to produce clean milk paired off with ten Kelton dairy farmers for one day, in order to see what could be done by good dairymen even on farms with which they were not familiar. The Kelton dairymen had never attempted to produce high grade milk.

[1] North, C. E., *Farmers' Clean Milk Book*, p. 78. [2] *Ibid.*, p. 81.

The result as measured by bacterial count is shown by the following table, giving the count in milk produced by Kelton dairymen on their own farms on April 5 and by Oxford dairymen in the barns of the Kelton dairymen on April 6.

TABLE VII [1]

Bacterial Tests of Milk Produced in Kelton Dairies

By Kelton dairymen, April 5	*By Oxford dairymen, April 6*
1,830,000	3,300
1,520,000	3,100
4,830,000	4,600
4,000,000	7,000
1,450,000	4,100
3,600,000	61,000
60,000	800
	2,500
70,000	1,600
500,000	5,600

In 1915 the Geneva (N. Y.) Experiment Station published a comparison of bacterial counts and barn scores.[2] It compared on thirty-four farms the bacterial count with the barn and method scores as established by the New York City score card and the United States Department of Agriculture score card. Taking the four ranking highest according to the New York City score card, we have the following comparison:

TABLE VIII

Rank according to:		
New York City score	*U. S. Dept. of Agri. score*	*Bacterial count*
1	1	30
2	2	16
3	3	18
4	15	13

[1] North, C. E., *Farmers' Clean Milk Book*, p. 113.

[2] Bul. 348, p. 120, N. Y. Agri. Experiment Station.

It will be noticed that there is a wide divergence between the results of the score cards and the bacterial count. If we take the highest four scores according to the New York City method, the ranks are respectively 30, 16, 18, and 13 as regards bacterial count; that is, milk produced on the farm ranking highest according to the New York City score card ranked thirtieth when subjected to the bacterial count test. The same station had already shown that certain requirements exacted of dairymen did not help in producing more sanitary milk.[1] The United States Department of Agriculture has shown that the amount of sediment indicated by the sediment tester is no adequate criterion of cleanliness, since the dairymen may strain out the coarse particles of dirt by the use of cotton gauze strainers.[2] Straining out filth does not make clean milk, nor does clarification. But either may make it appear clean, even when examined by means of a sediment tester. On the other hand, germ content alone is also an unsafe guide, for a great deal depends upon the kind of germs present.

It is now coming to be quite definitely accepted that, given a reasonably low bacterial count as an indication of decency in production and handling, the element of safety can be added by pasteurization. When first introduced, pasteurization was often practiced covertly on account of public prejudice against it.[3] Gradually, however, the leading dealers came to adopt the practice openly. One Baltimore dealer pasteurized milk for infants as early as 1893, and "pasteurization was begun in Cincinnati in 1897, in New York in 1898, in Philadelphia in 1899, in St. Louis

[1] Bul. 365, p. 197.
[2] U. S. Dept. of Agr. Bulletin 361.
[3] Parker, H. N., *City Milk Supply*, p. 269.

in 1900, in Milwaukee in 1903, in Boston and in Chicago in 1908." [1]

The first city to make pasteurization compulsory was Chicago, which in August, 1908, passed an ordinance requiring that after January 1, 1909, all milk, unless from tuberculin tested cows, offered for sale in the city be pasteurized.[2] Since that time quite a number of other cities have made pasteurization compulsory. Spargo shows that pasteurization was in 1908 required or officially encouraged in forty-six of fifty-two leading cities of the United States. He gives figures showing that in many of the cities from 90 to 97 per cent of the milk supply was pasteurized, and that the larger cities for the most part had the greatest percentage of pasteurized milk.

The situation as found in the cities of Wisconsin in the summer of 1916 is probably more or less typical of the situation in other parts of the country. The following table shows the extent to which pasteurization was carried on in some of the cities of the state at that time.[3]

TABLE IX

Raw and Pasteurized Milk Used in Cities of Various Sizes in Wisconsin, 1916

City	*Population in 1916*	*Raw milk, percentage*	*Pasteurized milk, percentage*
Milwaukee	436,535	8.5	91.5
Oshkosh	36,065	91.4	8.6
Green Bay	29,353	26.0	74.0
Eau Claire	18,807	80.2	19.8
Beloit	18,072	43.2	56.8

[1] Parker, H. N., *City Milk Supply*, p. 269.
[2] Straus, Lina G., *Disease in Milk*, p. 70.
[3] Wis. Agr. Exp. Sta. Bul. 285, p. 8.

Although milk comes from far outside the boundaries of most cities, often across numerous state lines,—New York City at times draws milk from seven states and from two Canadian provinces [1]—cities have relatively little trouble in finding means of controlling their milk supplies.

Four principal methods are at present in use for safeguarding the milk supply of cities and towns: first, control of source of production and distribution, usually by means of some system of permits or licenses. This method is commonly combined with inspection of premises and examination of milk sold. It makes possible control of production of milk outside of the city's boundaries and even outside of the state in which the city is located. New York City, for example, imposes restrictions upon the producers in other states as well as in the state of New York. It does this by barring all milk which does not comply with specified requirements and which is produced by men who do not permit its inspectors to make examinations of premises at all times. The second method in use for the control of the milk supply of cities and towns is controlled by examination of milk sold, which method is usually limited to the larger cities, where laboratories are available for analysis of samples. By checking up on each producer's milk reaching the plants, a small force can control a large area, since only farms with a high count need be inspected often. The third method is the safeguarding of consumers by means of pasteurization of the milk supply. This method is commonly used in combination with the other two and is seldom relied upon as the sole method.

The fourth method is publicity. In some of the smaller

[1] Brown, Lucius P., in *Report of Special Milk Board of Mass.*, 1916, 221.

cities particularly, the frequent publication of barn or milk plant scores or of the bacterial counts of the milk produced by each dealer has had a very salutary effect. The Board of Health of Lexington, Kentucky, for example, has been for a number of years publishing monthly a chart (see Figure 1) showing by means of parallel bars the bacterial

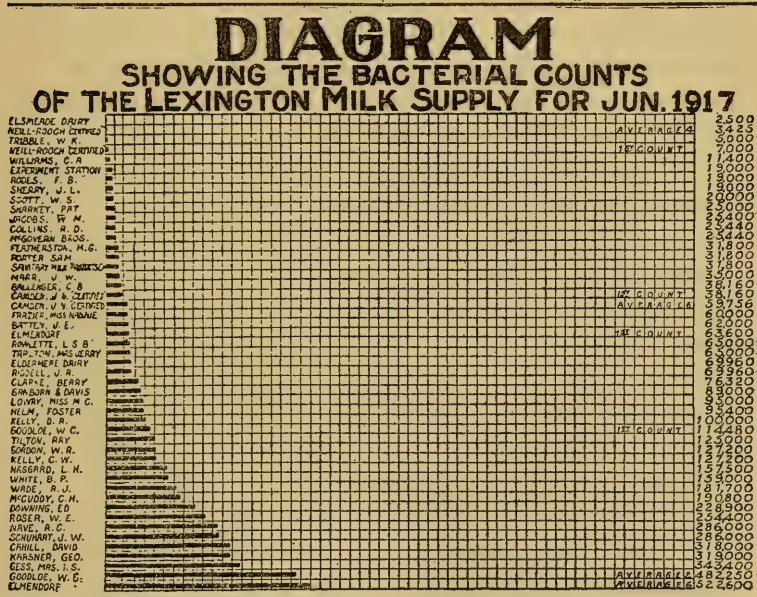

FIG. 1.—Diagram Showing the Bacterial Counts of the Lexington (Ky.) Milk Supply for June, 1917.

count of each dairyman's milk. The advertising done by a progressive dairyman has often accomplished the same results by compelling other dairymen to institute more up-to-date methods. Such was the case in Beloit, Wisconsin, where in 1916 there was practically no control of any sort, yet milk of a high grade was being sold. Some very poor, if not actually dangerous, milk was, however,

also being sold, and this is the weakness of this method when used alone,—namely, that it does not reach all producers.

The question often arises as to who should regulate. In most instances regulation is done by the cities. The larger cities in particular usually go far beyond state requirements. Chicago and Milwaukee, for example, passed their tuberculin test ordinances before such legislation was even seriously contemplated for the entire state, and, as a matter of fact, such legislation has not been passed up to the present time in these states. In 1916 New York maintained a force of twenty country inspectors, three inspectors of city terminals, fifteen inspectors for the city proper and a supervisor for each of the two larger groups, making a force of forty-two men in addition to the necessary clerical and laboratory force which the city maintains. New York City also has elaborate laboratory facilities for this work. All of this is over and above regulatory machinery which the state itself sees fit to maintain.

There are, however, some disadvantages to city inspection of milk and milk sources. In case of a milk shortage the city authorities are likely to be lax in the enforcement of important health requirements in order to secure the desired supply. Milwaukee, for example, in 1914 allowed milk to come in on the mere promise that the farmers would shortly comply with the requirements. In this way the city hoped to force the boycotting farmers to come to terms. Moreover, in case of milk shortage, the city with the stringent regulations is likely to suffer. In the summer of 1918 the city of Columbus was so short of milk that some dealers were unable to supply all of their customers. Springfield, however, only forty-four miles away,

had plenty of milk, but it was not available to Columbus because Springfield had practically no health regulations in force and therefore Columbus health authorities refused to permit the milk to be brought in.

To some extent, also, a city like New York or Boston carries the burden of inspection for much of the surrounding territory. A few years ago the city of Boston, claiming that the city itself was carrying the burden for surrounding towns, attempted to get the state to undertake inspection.[1]

State control, as has occasionally been stated, would undoubtedly be desirable from some points of view. In many instances at the present time where the milk zones of different cities overlap, there is considerable duplication of inspection, as, for example, in the case of a dairyman who wishes to be in a position to choose among several markets. Some milk shipping stations actually send milk to several cities regularly, and are subject to the inspection at frequent intervals of several sets of milk inspectors.[2]

From the point of view of public expenditure state inspection would be somewhat of a saving, since the state should be able to maintain adequate inspection more cheaply than each municipality can maintain its own force. In Essex County, New Jersey, sixteen municipalities are reported to be maintaining independent inspection forces.[3] Efficient state control should cost no more, certainly, than the combined control of many cities for the same sort of service. Any added cost would probably be due to the better service rendered to the smaller cities, which at the present time are extremely lax in their methods. Thus

[1] *Report of Special Milk Board of Massachusetts*, 1916, p. 15.

[2] *New York Report on Dairy Products, Livestock and Poultry*, 1917, p. 685.

[3] King, Clyde L., *Lower Living Costs in Cities*, p. 213.

early in 1919 a government investigation showed that of 1,327 cities and towns only 265 had regular dairy and milk inspection. Less than one-seventh of the cities with a population between five thousand and twenty-five thousand reported any dairy inspection.[1]

It is a question, however, whether in a state like New York or like Illinois the larger cities would be satisfied with such inspection as the state would be willing to give.[2] Although in most states with no large cities, state inspection would doubtless be found satisfactory and adequate, under existing conditions the states can do most good by cooperating with cities, especially with those cities which do not have adequate facilities for inspection.

Federal regulation, of course, is out of the question, since it can regulate only such milk supply as crosses state lines. Instead of improving the milk supply, federal regulations would merely keep milk within state lines and often give farmers in one state a practical monopoly of the milk business for certain cities.[3]

An attempt was made in 1916 to determine the extent to which the marketing of milk is regulated by the various cities and villages of Wisconsin. The results are more or less typical of conditions in other sections of the country. Letters were sent to 128 cities and incorporated towns. Replies from 120 of these indicate that milkmen are required to be licensed in 26, and 12 of the 120 stores which deal in milk are required to be licensed. Through the Municipal Reference Bureau of the Extension Division of the University of Wisconsin an attempt was made to

[1] *Creamery and Milk Plant Monthly*, May, 1919, p. 37.

[2] *New York Report on Dairy Products, Livestock and Poultry*, 1917, p. 672.

[3] Address of Dr. Carl Alsberg, Chief of Bureau of Chemistry, U. S. Dept. of Agr., *Twenty-third Annual Report of Ohio State Dairymen's Association*, 1917, p. 94.

secure copies of all existing milk ordinances. Letters sent to all the cities, towns, and villages of a thousand or over brought 78 replies. Of these 29, including one village, had ordinances. A study of the provisions of 26 of these reveals the following provisions which are important to the milkman: [1]

Provisions	*Number of instances*
1. Inspection of dairies required (inspection specifically authorized in nearly every case)	15
2. License required for milkman	22
3. Certificate required showing herd to be free from dangerous diseases, especially tuberculosis, test for the latter being usually specifically mentioned	15
4. Specific exemption for pasteurized milk as to Provision 3	3
5. Specific regulations as to handling of milk	13
6. Covered wagon required for delivering milk	3
7. Forbidding use of any but single service milk tickets	3
8. Requiring higher percentage of total solids than is required by state law (state law required 11½%, whereas the 7 cities referred to required 12%	7
9. Specifying a bacterial count (lowest 250,000, highest 500,000 to the cubic centimeter)	8
10. Requirement of a fee, usually $1 per year; sometimes based on the number of cows (10 cents or more a cow), sometimes on the number of delivery wagons (50 cents to $1 a wagon)	21

In the spring of 1918 the Dairy Division of the United States Department of Agriculture sent inquiries to all cities of over five thousand population and received replies to its questionnaire from 481 cities. The question-

[1] Wis. Agr. Exp. Sta. Bul. 285, p. 15.

naire brought out the following facts as to the extent of inspection in the various cities:

TABLE X

Extent of Inspection in Group of U. S. Cities, 1918 [1]

Size of cities	*Percentage of cities in which complete analysis and dairy inspection occurred*
5,000 to 25,000	11.6
25,000 to 50,000	51.4
50,000 to 100,000	59.4
100,000 to 500,000	85.3
500,000 and over	88.0

The points which ordinarily come under control are the following:

1. Chemical standards
   a. Determination of butterfat and of solids not fat.
   b. Detection of watering or of skimming.
   c. Detection of the presence of preservatives or of other adulterants.
2. Temperature.
3. Bacterial content.
4. Pasteurization; where required the precise method, time, and temperature are often specified. Repasteurization is usually prohibited.
5. Sanitation; the score card method is most usual, since it gives the inspector a guide to follow.
6. Health of cows as regards:
   a. Tuberculosis.
   b. Other diseases.
   c. Date of freshening.
7. Health of men engaged in dairies.
8. Compulsory bottling (prohibition of street dipping).

[1] *International Association of Dairy and Milk Inspectors*, 1918, p. 128.

Though such a multitude of regulations undoubtedly hampers the producers and distributors, and though many of them are doubtless superfluous, the results of public control amply justify any incumbrances placed on the milk business. A few rather striking examples may serve to illustrate this point. The results of milk inspection in Ithaca, New York, show that whereas in 1907 the average bacterial count of milk examined was 760,250 per cubic centimeter, in 1914 the average count was but 142,860. In 1907 only 10.59 per cent of the samples showed a bacterial count of less than 10,000 per cubic centimeter, whereas in 1918 48 per cent fell in this group.[1] The death rate per thousand in New York City has been decreasing rather rapidly, and part of this decrease is very generally ascribed to the improvement in the milk supply.[2] The following figures are given:

TABLE XI

Decrease in Infant Mortality in New York City, 1891–1916

Year	*Deaths per one thousand annually among children under five years of age*	*Annual rate, July and August only*
1891	96.5	125.1
1892	96.2	135.2
1915	37.5	41.6
1916	34.0	39.5

In addition to this increased safety given by public control there is the gain from a decrease in the amount of adulteration and from a general improvement in the milk

[1] *International Association of Dairy and Milk Inspectors*, 1915, p. 157.
[2] Straus, Lina G., *Disease in Milk*, pp. 90–91.

supply, much of which could scarcely have been brought about by competition alone.

Section 6. Standards and Grades

Legal standards for milk are quite necessary. In the first place, the consumer cannot determine for himself whether the milk complies with his particular consumption standard or not. Though he can in a general way tell whether milk is deficient in fat and in solids not fat, there is a wide range within which he cannot distinguish. That being the case, there is always the temptation for competitors to cut down slightly in the quality, as measured by fat content particularly. Hence competition often reduces rather than improves the quality. As for sanitary conditions under which the milk is handled and as to its safety with regard to its germ-carrying possibilities, the consumer is entirely in the dark. The result is that the honest producer and the honest distributor are penalized, since the dishonest man can sell an inferior milk at the same price that the better milk brings.

Government standards are usually minimum standards, and it often appears that there is a tendency for them to become also maximum standards. For example, where there is a minimum requirement of 3.25 per cent fat, the dealers are inclined to market milk which comes as near this minimum standard as possible without too much risk of occasionally dropping below. There are, however, instances where competition seems to keep the quality rather high. In Columbus, Ohio, though the city minimum is 3 per cent, a considerable proportion of milk sold is 4 per cent or better, which the dealers claim is about the standard demanded by consumers.

Since existing local standards vary more or less in different parts of the country, the United States Department of Agriculture has issued the following as "Food Inspection Decision 178," adopted as a guide for officials in enforcing the Food and Drugs Act:

"1. Milk is the whole, fresh, clean, lacteal secretion obtained by the complete milking of one or more healthy cows, properly fed and kept, excluding that obtained within fifteen days before and five days after calving, or such longer period as may be necessary to render the milk practically colostrum free.

"2. Skimmed milk is milk from which substantially all of the milk fat has been removed.

* * * * * * * * *

"5. Pasteurized milk is milk that has been subjected to a temperature not lower than 145 degrees Fahrenheit for not less than thirty minutes. Unless it is bottled hot, it is promptly cooled to 50 degrees Fahrenheit or lower.

* * * * * * * * *

"7. Homogenized milk or homogenized cream is milk or cream that has been mechanically treated in such a manner as to alter its physical properties, with particular reference to the condition and appearance of the fat globules."

The Bureau of Chemistry of the United States Department of Agriculture in 1918 issued the following list of standards as found on the statute books of the states indicated: [1]

[1] Rules and Regulations for the Production of Clean and Safe Milk. Bu. of Chemistry, U. S. Dept. of Agr. Jan. 28, 1918. Mimeographed Pamphlet, page 12.

TABLE XII

Milk Standards

States	Total solids,[1] %	Solids not fat, %	Fat, %	Prohibitions	
				Days before calving	Days after calving
California	.....	8.50	3.00	15	5
Colorado	.....	....	3.00	..	..
Connecticut	11.75	8.50	3.25	..	..
Idaho	11.00	8.00	3.20	15	4
Iowa	12.00	....	3.00	15	5
Kansas	.....	....	3.25	15	5
Louisiana	.....	8.50	3.50	14	5
Maine	11.75	....	3.25	..	..
Massachusetts	12.15	....	3.35	..	..
Michigan	12.50	....	3.00	8	4
Minnesota	13.00	....	3.25	..	..
Mississippi	.....	....	....	..	..
Montana	.....	8.50	3.25	15	5
Nebraska	.....	....	3.00	15	5
New Hampshire	12.00	....	....	..	..
New Jersey	11.50	....	3.00	..	..
New York	11.50	....	3.00	15	5
North Dakota	12.00	....	3.00	..	..
Ohio	12.00	....	3.00	..	..
Oklahoma	12.50	....	3.00	..	..
Oregon	.....	8.50	3.20	15	5
Pennsylvania	12.00	....	3.50	..	..
South Dakota	.....	....	....	15	5
Utah	12.00	....	3.20	..	..
Vermont	12.50	9.25	....	..	..
Wisconsin	.....	8.50	3.00	8	4

[1] The composition of milk varies considerably. E. H. Farrington and F. W. Woll in their *Testing Milk and Its Products* give the following on the composition of cows' milk:

	Minimum	*Maximum*	*Average*
Water	82.0 per cent	90.0 per cent	87.4 per cent
Fat	2.3	7.8	3.7
Casein and albumen	2.5	4.6	3.2
Milk sugar	3.5	6.0	5.0
Ash	.6	.9	.7

Ordinances of the various cities usually provide for standards conforming closely to state standards, although they frequently vary somewhat from those of the states. Following are the fat and total solids standards for a number of cities and their respective states:

TABLE XIII

Comparison of State and City Milk Standards

City	Fat standard		Solids (total)	
	City, %	State, %	City, %	State, %
Chicago, Ill.	3.0	3.0	12.0	11.5
Cleveland, O.	3.0	3.0	11.5	12.0
Youngstown, O.	3.0	3.0	12.0	12.0
Columbus, O.	3.0	3.0	12.0	12.0
Elyria, O.	3.0	3.0	11.5	12.0
Milwaukee, Wis.	3.0	3.0	12.0	11.5
Pittsburg, Pa.	3.0	3.5	12.0	12.0

In most cities milk is sold with no reference to grade. City inspection, where there is any, merely determines whether the product is fit for food at all. If it is, it may be sold as "milk." It is coming to be recognized, however, that there are differences in the demands for milk which are legitimate and which can be met only at varying costs. For example, milk for infants must be of the very highest quality from a sanitary point of view at least. For cooking purposes, however, this is not so important, since there is no danger from even a rather high bacterial content in milk which is to be cooked. The latter grade can be produced at a much lower cost.

Some few cities are now making allowance for such differences in demand by having milk graded and the various grades labeled in order that the consumer may know what grade he is getting and pay accordingly. These dif-

ferences form the broad, general basis of present grades of milk, namely: (a) milk for infants to drink; (b) milk for adults to drink; (c) milk for cooking only. Under each of these there should doubtless be a number of sub-grades based on fat content. The principal points which are considered in establishing the various grades are the food value and questions of safety and decency.

Milk as found on the market might be classified as follows:

1. Ordinary milk
   (*a*) Raw
   (*b*) Pasteurized
2. Graded milk (mostly raw)
   (*a*) Certified milk
   (*b*) Unofficial or so-called certified milk
   (*c*) Inspected milk
   (*d*) Miscellaneous special grades

A very large part of the milk sold is ordinary milk, either raw or pasteurized. Practically all that is retailed directly by producers is raw, whereas much of that sold by dealers is pasteurized. About all that is required of ordinary milk as commonly sold is that it be clean enough to pass the inspection of the buyer, and that it and the conditions under which it is produced comply with state and city sanitary requirements as interpreted by state or city officials.

What may be called graded milks are of a wide variety as far as names are concerned. Best known among these is certified milk. This term is properly applied to milk produced under the approval of a medical milk commission. The term "certified milk" originated with Dr. Henry L. Coit of Newark, New Jersey, who formulated the plan for the first medical milk commission, which was

organized in 1893. In 1904 the term "certified" was registered in the United States Patent Office to protect it from being degraded by milkmen not under contract with a medical commission. There were in 1917 seventy-nine such medical milk commissions in the United States, all of them being members of the American Association of Medical Milk Commissions. A few states forbid the sale of milk as certified unless produced under the approval of regularly organized medical milk commissions.

Though most medical milk commissions are somewhat similar in character, there are some differences, as, for example, in the three commissions located respectively in Milwaukee, Chicago, and Minneapolis. The Milk Commission of the Milwaukee Medical Society is composed of nine members, all of them physicians. They are appointed yearly by the Milwaukee Medical Society, under which the commission operates. The expenses, including inspection expenses, are met by the producers of certified milk and are prorated on the basis of number of quarts sold in Milwaukee and suburbs. The inspecting is done by the commission and consists of monthly sanitary inspection, monthly health inspection of employees, veterinary inspection at least every two weeks, and weekly examination of milk. All inspections are made without previous notice. The score card of the Dairy Division of the United States Department of Agriculture is used in the sanitary inspection.

The Milk Commission of the Chicago Medical Society is composed of seven members, all physicians, elected for three years by the County Medical Society. The expenses are prorated to the different farms which choose to operate under the commission. The inspection is done by the society on the basis of the government score card.

The Minneapolis Milk Commission is composed of three members, all physicians, one of whom is appointed each year by the incoming president of the Hennepin County Medical Society. The expenses are met by a tax of one-fourth cent on each gallon of milk sold. The tax is subject to a rebate of the unused portion. The inspecting is done by the commission, though the city health department and the state inspectors coöperate, the former making all necessary milk tests and the latter scoring the farms on the state score card.

Though the publicity given the production and sale of certified milk has undoubtedly had a very beneficial influence on the quality of the ordinary milk sold, the actual amount of certified milk sold is relatively small. A New York producer of certified milk recently stated that there are only forty certified milk farms in the whole state of New York.[1] In other states the number is even smaller. Because of its high cost certified milk is and will continue to be put out at prices beyond the reach of most consumers.

The state of New York has gone further than most other states or most cities in establishing grades of milk. In 1918 it issued a list of grades with rather elaborate regulations.[2] They were as follows:

Certified.
Grade A, raw.
Grade A, pasteurized.
Grade B, raw.
Grade B, pasteurized.
Grade C, raw.
Grade C, pasteurized.

These are fully described in Regulation 13 of the Sani-

[1] *Hoard's Dairyman*, March 19, 1920, p. 574.
[2] *Sanitary Code* established by the Public Health Council—Albany.

tary Code [1] and were based on the recommendations of Dr. C. E. North and others as given in the following report of a Committee on Milk Standards of the American Public Health Association.[2]

The committee reports as follows:

"1. Resolved that 'all milk should be classified by dividing it into three grades which shall be designated by the letters of the alphabet.' The requirements for the three grades should be as follows:

Grade A

"2. *Raw Milk.*—Milk of this class should come from cows free from disease as determined by tuberculin tests and physical examinations by a qualified veterinarian, and should be produced and handled by employees free from disease as determined by medical inspection of a qualified physician, under sanitary conditions, such that the bacterial count does not exceed 10,000 per cubit centimeter at the time of delivery to the consumer. It is recommended that dairies from which this supply is obtained score at least 80 on the United States Bureau of Animal Industry score card.

"3. *Pasteurized Milk.*—Milk of this class should come from cows free from disease as determined by physical examinations by a qualified veterinarian, and be produced and handled under sanitary conditions, such that the bacterial count at no time exceeds 200,000 per cubic centimeter. All milk of this class should be pasteurized under official supervision, and the bacterial count should not exceed 10,000 per cubic centimeter at the time of delivery

[1] *Sanitary Code* established by the Public Health Council—Albany. See Appendix A.

[2] *American Journal of Public Health*, Vol. 8 (1918), p. 228.

to the consumer. It is recommended that dairies from which this supply is obtained score at least 65 on the United States Bureau of Animal Industry score card.

Grade B

"4. Milk of this class should come from cows free from disease as determined by physical examinations, of which one each year be by a qualified veterinarian, and should be produced and handled under sanitary conditions, such that the bacterial count at no time exceeds 1,000,000 per cubic centimeter. All milk of this class should be pasteurized under official supervision, and the bacterial count should not exceed 50,000 per cubic centimeter when delivered to the consumer.

"It is recommended that dairies producing Grade B milk should be scored, and that the health departments or the controlling departments, whatever they may be, strive to bring these sources up as rapidly as possible.

Grade C

"5. Milk of this class should come from cows free from disease, as determined by physical examinations, and should include all milk that is produced under conditions such that the bacterial count is in excess of 1,000,000 per cubic centimeter.

"All milk of this class should be pasteurized, or heated to a higher temperature, and should contain less than 50,000 bacteria per cubic centimeter when delivered to the consumer.

"6. Whenever any large city or community finds it necessary, on account of the length of haul or other peculiar conditions, to allow the sale of Grade C milk, its sale should be surrounded by safeguards such as to insure

the restriction of its use to cooking and manufacturing purposes.

C. E. NORTH, *Chairman*,
JAS. S. NEFF,
October 17, 1917. A. D. MELVIN."

One does not proceed far into the matter of the grading of milk before coming to the question of standardization of fat content. Many cities and states now forbid standardization. In cities where much milk is sold by small producers and where there is inadequate inspection this practice may be justified, but in cities having most of the milk sold by a few large dealers and having an adequate inspection force, it would seem that standardization is desirable, if each grade is plainly labeled. Such standardization would permit the dealer to sell milk of 2, 3, 4, or 5 per cent fat content, each under its own label and each at a different price. The dealer could maintain these fat standards and build up a trade for each. This would be of advantage not only to the dealer but to the consumer as well, since many consumers prefer milk varying in richness from the grade usually sold. It would also benefit producers, because the dealer, selling on a quality basis, would be willing to pay on a quality basis.

That grading of milk can be established in any city was the opinion of a committee of the Boston Chamber of Commerce which made a careful study of the matter in 1916.[1] The committee further states: "The experience of cities where grading has been attempted furnishes conclusive proof that no city can properly refuse to grade its milk on account of the cost."[2] Thus far, however, relatively few

[1] *Grading and Labelling of Milk and Cream*, Boston, 1916, p. 14.
[2] *Ibid.*, p. 14.

cities have made any provision whatever for grading. Grading, of course, implies labeling in order that the consumer may know what kind of milk he is buying.

In those cities in which grading has been established, the greater portion of the milk falls into one of the middle grades. In New York, for example, a very large proportior is Grade B, whereas only a relatively small proportion is Grade A milk. The demand for the high grade of milk is quite decidedly limited and will probably be still further limited as the lower grades are made safe by pasteurization. So long as safety can be assured in that way, the average consumer does not care to pay several cents extra for a certified or other official grade of milk.

Section 7. Basis of Payment for Milk

It is very difficult to compare milk prices paid in different parts of the country because of the fact that for the most part the basis of payment is for different units in different sections of the country. Although the tendency is more and more towards payment by the hundredweight, with an allowance for butterfat above or below some basic fat content, there is still a wide diversity in the basis of payment.

In 1915 the Dairy Division of the United States Department of Agriculture issued the following as being among the systems most commonly used: [1]

"1. By the quart or gallon.

"2. By the can, the size of the can varying from 8½ to 40 quarts or more.

"3. By the can; the can of milk must come up to the standard weight.

"4. By the can or the gallon, with a minimum standard for

[1] *Milk Plant Letter 23.*

butterfat, with a definite premium per gallon for each one-tenth point butterfat above standard.

"5. By the gallon, the number of gallons being determined by dividing the weight by 8.6.

"6. By weight, which is determined by the number of cans, each can being supposed to hold a certain quantity of milk by weight.

"7. By weight, the milk being weighed at receiving station or at city plant.

"8. Same as No. 4, with minimum standard for dairy farm score, and premium for extra points in this score.

"9. A certain price for a pound of butterfat and for 100 pounds of skimmed milk.

"10. Same as No. 9, only the weight of the whole milk is considered instead of the skimmed milk.

"11. On the weight basis, with a minimum standard for butterfat and premium for extra points. Sometimes the butterfat standard is established and deductions made for each one-tenth point below this standard, as well as premiums for each one-tenth point above it. In some cases the premium is paid only for milk of three-tenths point or more above the standard, while the deductions begin at one-tenth point below.

"12. A certain price per 100 pounds, depending on the per cent of butterfat, allowing 3 cents per one-tenth point butterfat above or below the base price for the month for 100 points in summer and 4 cents in winter. (Base price for each month is from the average per cents of butterfat contained in the milk for those months for a period of years.) Milk below 2.8 per cent butterfat is paid for on the basis of sweet-cream fat. Deduction is made for milk of solids not fat below 8.5 per cent.

"13. A certain price per point butterfat per gallon."

In addition to payment for various units, prices are quoted at various stages on the way to market. Thus in many cases prices are quoted for milk delivered at the plant door; in other instances the quotation is for milk

f. o. b. the city railway station; or again, a price may be quoted at the farm gate. Even here, however, one cannot be sure as to the prices received by the farmer, for the latter may have to pay all or a part of the cost of hauling. In many sections prices quoted are for milk delivered. at the country bottling plant. Many companies make quotations at several different stages to accommodate farmers variously located. For example, it is not at all uncommon to find a company buying from farmers who deliver their own milk at the city plant door and at the same time gathering milk from the farms of others, and paying them different prices, while in another part of its milk territory the same company may be operating a country bottling plant and basing its payments on milk delivered at that place.

The Babcock test, since its introduction, has been widely adopted as one of the factors in the basic price. Perhaps the most usual method is to pay for milk of a given richness in fat, say 4 per cent, at so much per hundredweight. Then for each one-tenth of one per cent of butterfat above the basic test, a certain number of cents are added and the same number of cents deducted for milk testing less than this basic test. In many instances this differential has been so low as to be prejudicial to men with cows producing milk rich in fat. It would seem that this differential should be quite close to the market price of butterfat.[1]

[1] For a further discussion of this point see Appendix B.

CHAPTER III

THE MARKETS FOR WHOLE MILK

Section 1. The City as a Market

As shown in the first part of Chapter II, only about 14 per cent of the total amount of milk produced each year enters directly into the milk problem, since it is about that proportion which is consumed in its fluid form in our large urban centers. Most of the remainder is worked up into some other form or is utilized directly without becoming an article of commerce. It is with the market for this 14 per cent and with the possibility of shifting the remaining 86 per cent from one outlet to another as occasion demands that we are concerned in the present chapter.

The residents of our cities with almost no exceptions use milk in one way or another as an article in the daily diet. Nearly every one of these is dependent for his supply upon the producers within a limited radius about the city. Milwaukee, Wisconsin, and its suburbs in 1919 required upwards of five thousand eight-gallon cans of fresh milk daily. At present Milwaukee gets the bulk of its milk from within a radius of about thirty miles, although it occasionally reaches out to upwards of eighty miles. Chicago, according to the Health Department's estimate, required in 1916 approximately 265,000 gallons daily. Chicago is now obtaining some milk from Fond du Lac, Wisconsin, nearly one hundred fifty miles distant, but its regular milk zone has a radius of from seventy-five to one hundred miles.

A rapidly growing city usually constitutes a very desirable market for the farmers in its vicinity, since it is a "seller's market" rather than a buyer's, and hence the farmer stands in a favorable bargaining position. Sometimes, however, even nearness to such a city does not help in getting the most desirable prices, for much more milk may be readily available than even a growing city needs. This is true with regard to many cities situated in condensery or other dairy districts. Toledo, Ohio, Detroit, Michigan, and Milwaukee, Wisconsin, are all so situated as to be able to tap considerable milk reservoirs rather easily.

How much milk may be considered available for a city like Milwaukee? In this particular instance between two circles, one with a radius of thirty miles, the other with a radius of eighty miles, a vast amount of milk is produced, little of which reaches the city in fluid form. In 1916 the writer, after a somewhat careful survey, made the estimate that if Milwaukee received the milk from all the cheese factories then located at convenient shipping points within an area with a radius of fifty miles, the city would have had at least three times as much milk as it actually needed. And how much would it have paid to get it? In normal times it would have to pay enough to cover additional transportation charges of from five to ten cents a can, plus a few cents extra for additional trouble and for compensation for the loss of the whey. Such an increase in the price, however, would stimulate greatly the production within the zone already supplying the city. One of the leading dealers of Milwaukee is authority for the statement that the city milk zone was no larger in 1916 than it was twenty years earlier, although the city had grown at a remarkable rate. How such increase in the supply from a

given territory could take place may be seen by a study of the map in Figure 2, which shows the Detroit milk zone of 1915. This zone looks decidedly patchy on the map, that

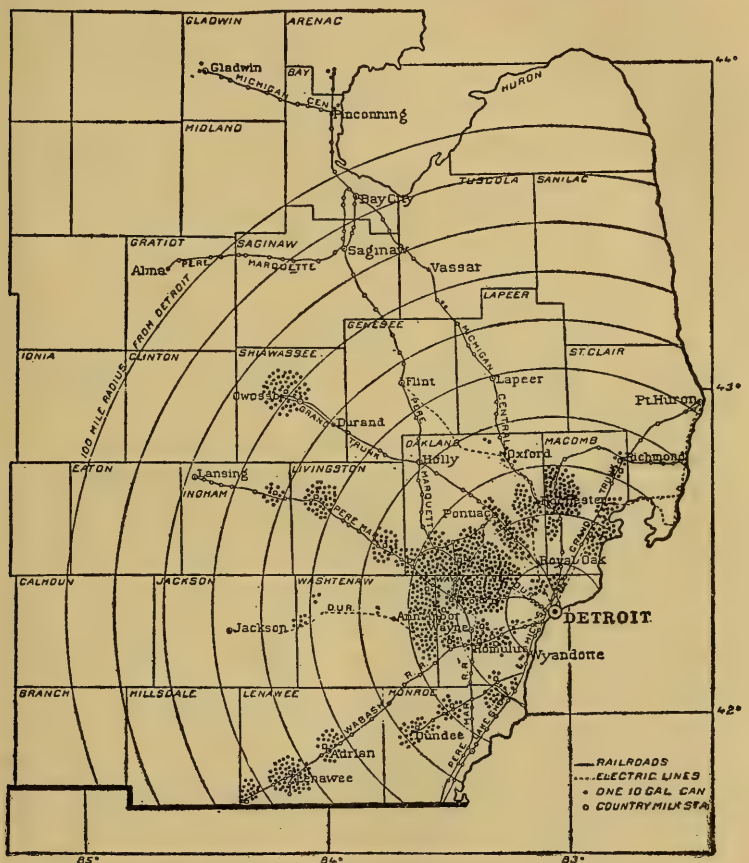

FIG. 2.—The Detroit Milk Zone. From U. S. Dept. of Agr. Bul. 639.

is, the milk seems to come mainly from certain neighborhoods. Now a somewhat higher price relative to prices for other farm produce would doubtless have induced

many farmers in sections not then producing milk to take up its production. That is probably what happened in the case of the Milwaukee milk zone.

Figure 3 shows the Milwaukee zone and that part of the Chicago zone which lies in Wisconsin. The solid black squares represent milk going to Milwaukee. The solid black circles represent milk going to Chicago. It will be noticed that the two overlap considerably. For this reason prices in the two centers can never for long be far apart, since it is always relatively easy for some producers to change from one market to another. It will also be noticed that the principal cream shipments come from a zone farther from the city. In case the city needs more milk, it is always possible to convert some cream producers into milk producers, thereby increasing the city's fluid milk supply.

The situation just described for Chicago and Milwaukee also obtains for such districts as northeastern Ohio and western Pennsylvania, in which are located such cities as Cleveland and Pittsburg and the smaller cities of Akron, Youngstown, and Warren. Similar situations also obtain in the New York milk zone and in the milk zone of any other large city which overlaps the milk zones of other cities or includes within its own the entire milk zones of minor cities. The dealers in smaller cities which are within a larger milk zone, as, for example, Elyria in the Cleveland zone and Youngstown in the Pittsburg zone, find that in order to keep a supply coming their way they must pay nearly as much as the prevailing price in the larger center. In November of 1918 the milk price in Pittsburg was 39½ cents per gallon. The Federal Milk Commission for Ohio had established for Youngstown a minimum price of 34½ cents. The leading Youngstown dealer,

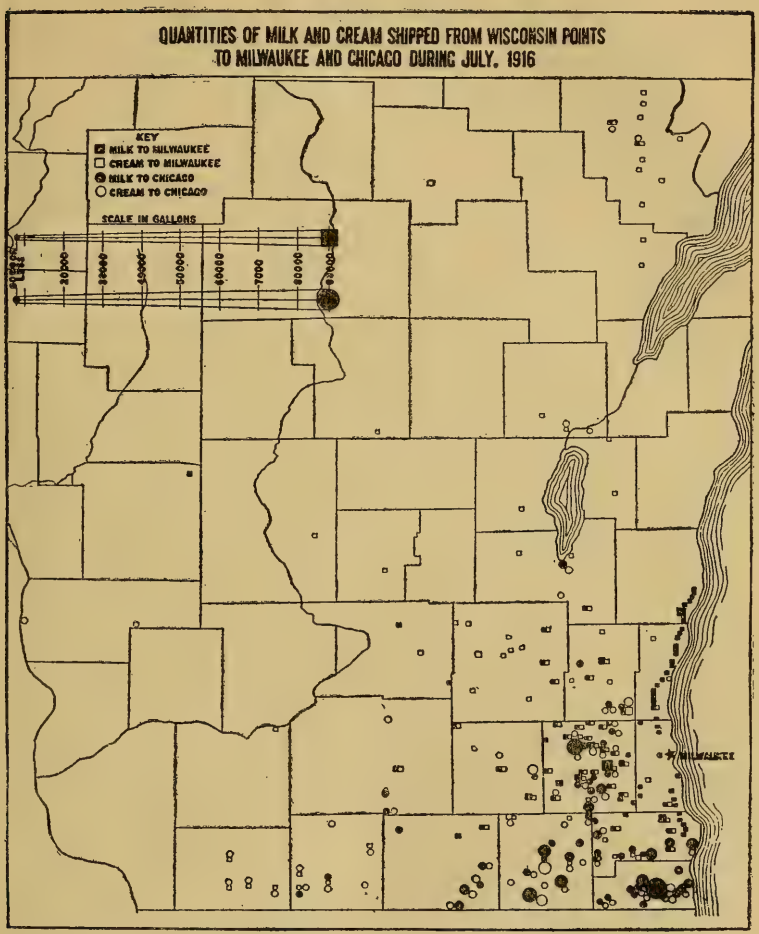

FIG. 3.—The Milwaukee Milk Zone. From Wis. Agr. Exp. Sta. Bul. 285.

however, at once raised his price to 35½ cents in order to get a sufficient milk supply. The same month the price at Ashtabula was 33 cents per gallon, which proved to be too low a price in relation to the Pittsburg price, and

milk began to leave the Ashtabula zone for Pittsburg, thus creating a deficit in the supply of the former city.

The largest milk market in this country is that of New York City. In the fall of 1917 the New York City Department of Health reported that milk was being received from 30,934 dairy farms, was collected at 800 shipping stations, and supplied the city during the month of November with a daily average of 1,627,127 quarts. Of this New York State supplied 1,402,277 quarts and Pennsylvania supplied 114,630 quarts. The balance came from New Jersey, Vermont, Connecticut, Massachusetts, and Canada.[1] The city is now said to reach out over five hundred miles in some instances.[2] The bulk of its supply, however, comes from about two hundred miles outside the city. For several years preceding March, 1919, the quotation on which New York milk was purchased was that of the one hundred sixty mile zone. In that month the producers succeeded in having the basic price quoted on the two hundred to two hundred ten mile zone, claiming that this zone represented more nearly the area from which the bulk of the New York supply came. One may get a still better idea as to the size of the New York milk zone by noting the following figures showing distribution of the membership of the New York Dairymen's League on March 1, 1920.[3]

There are several factors forcing the expansion of a milk zone. Most important perhaps is the case of companies engaged in the distribution of milk reaching out for additional or for cheaper milk. Only recently a Columbus concern, finding that it could not depend upon a suf-

[1] *Report of Mayor's Committee on Milk*, New York, p. 16.
[2] Wilson, C. S., *Ohio Farmer*, Dec. 6, 1919, p. 698.
[3] *Dairymen's League News*, March 10, 1920, p. 10.

TABLE XIV

Membership in Dairymen's League

State	*Leagues*	*Members*	*Cows*
Connecticut	17	828	10,395
Massachusetts	4	177	2,072
New Jersey	49	2,827	31,789
New York	774	60,915	683,691
Pennsylvania	225	15,076	119,577
Vermont	18	995	15,198
Total	1,087	80,848	862,722

ficiently large and regular supply close at hand, established a milk plant in a rather new section, hoping to build up a milk business there to supply its growing wants in the city. Very often milk companies make arrangements with outlying creameries or cheese factories whereby they agree to take the whole output of such creameries or factories or such portion of the output as they require, paying therefor enough to net the seller a little more than what he could get if the milk were made into cheese or butter. For a number of years prior to 1916 a Milwaukee concern had such arrangements with a creamery lying in the edge of the Sheboygan cheese district. The milk of this company was taken during only a portion of each year. In other instances certain concerns in the outer edge of the milk zone make arrangements to buy milk from producers and sell it wherever they can get the best price. In New York State large numbers of concerns are doing a business of that kind, making part of the time cheese or butter and at other times selling the cream to ice-cream factories and at still other times sending the whole milk to New York or to some other city.

In the neighborhood of condenseries a supply is readily available for city use, for as a rule condensery standards are nearly if not quite up to the standard of city requirements. Producers supplying milk to condenseries with these standards can easily switch over, or, what is more likely, the condenseries can change over as need dictates and send fluid milk to the city whenever that promises to pay better than sale through condensed milk channels.

The whole movement towards expansion is often facilitated by the fact that men on the outskirts of a zone are willing to take up the production of fluid milk for city use rather than of milk for cheese factory or creamery without fully realizing the additional expense necessary to comply with health department requirements. The average city is rather a particular market, as these numerous health requirements, already discussed, well show. The producers supplying milk to a city often find these regulations decidedly annoying, as when, for example, they are changed frequently, or when untrained and unsympathetic inspectors go out to enforce them. In most instances, however, these new producers are operating on somewhat lower-priced lands and hence can frequently produce milk somewhat more cheaply than can the producers in the older sections.

In the process of expansion of a milk zone more or less bitterness often arises between companies and producers, since the producers claim that the dealers play one section against another. More particularly the dealers are often accused of dropping or threatening to drop a man near the city by telling him that they can buy milk cheaper in some other section. Thus a man who is operating on expensive land and who has perhaps gone to considerable expense to equip his place for milk production is forced to

accept a lower price than he feels he can afford to take, because men farther out from the city have been found who can be induced to produce milk at a lower price.

Producers often assume that inasmuch as they have been supplying a city for a number of years, they have acquired a sort of vested right in the city's market. In the summer of 1918 several instances came to the writer's notice in which producers actually requested of the Federal Milk Commission for Ohio that it recognize such rights. In one instance particularly it was proposed that the leading dealer be prohibited from buying cheaper milk outside the regular milk zone for the purpose of distributing it in the city and thus lowering the price which the farmers could secure. They made the claim that he was actually producing a surplus by sending trucks into sections which had never before sent milk to the city. The dealer, on the other hand, showed that he was merely trying to build up a condensing business with the aid of auto trucks and claimed that he was benefiting the farmers as a whole, particularly those who had formerly had only a poor market for their milk. Naturally the commission refused to grant the request of the producers for a monopoly of the milk trade of the city, for that is what it would have been.

Section 2. Alternative Markets

What are the alternative markets in which a producer may sell? For many producers there is no good alternative market,—where, for example, in some localities the city demand has driven out local cheese factories and creameries, leaving the city milk trade as the farmer's only market, unless he chooses to make his cream into butter or cheese on the farm or possibly to ship the cream to a distant creamery or ice-cream factory. Again, a given

farmer may be on the route of a driver collecting milk for a nearby condensery. He cannot afford to haul his own milk. The hauler takes the whole load to his particular condensery. Now unless the farmer has some other equally cheap and convenient way of reaching another outlet, he is practically confined to this one market. In one of the condensery districts of Ohio, for example, the producer has exactly this situation to face. In this particular instance the condensery sends wagons around to gather the milk from farmers as far as from fifteen to twenty miles from the plant. Since many of the producers in this section produce less than a can of milk daily, they cannot profitably haul it to town themselves, and even if they did, they would have no other adequate market available. Here then they must sell to the condensery or choose the alternative of skimming the milk and selling the cream to a local or to a centralizer creamery. The price paid by the company at its plant in this territory in September, 1918, was $2.10 for 3½ per cent milk, whereas at a plant located on the edge of one of the city milk zones of Ohio, the price it paid was $3.00 for the same grade of milk.

It occasionally happens that a farmer has a choice between many markets; thus a man located at a point, let us say, between Merton and Pewaukee, Wisconsin, might dispose of his milk in any one of a number of different ways. He might:

1. Sell milk to a condensery at Merton.
2. Ship to a more distant condensery,—Oconomowoc or Burlington.
3. Ship milk to Chicago.
4. Ship milk to Milwaukee.
5. Sell milk to a cheese factory.

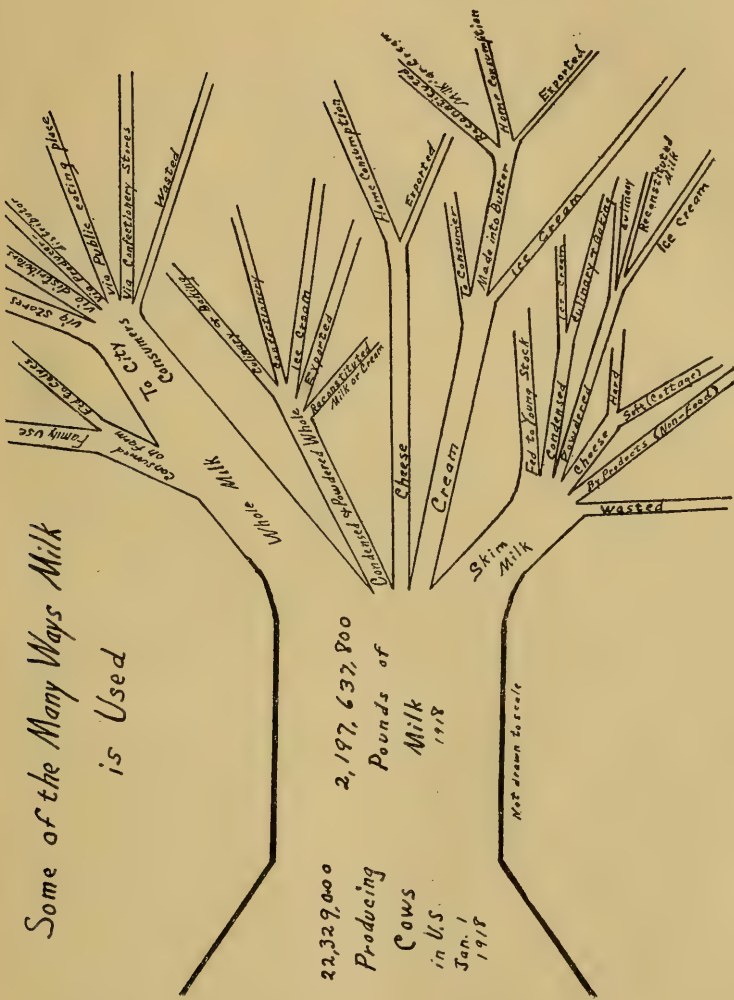

FIG. 4.—Some of the Many Ways Milk is Used.

6. Sell milk to a creamery.
7. Ship cream to Chicago.
8. Ship cream to Milwaukee
9. Sell cream to some neighboring creamery.
10. Sell sweet cream to some ice-cream factory.
11. Make butter at home.
12. Make cheese at home.

Few men, of course, have such a wide range of choice; in fact, even in the case supposed, some of the markets may be promptly ruled out because of the high cost of reaching them. Nearly every farmer, however, has several markets to which he can turn with no great inconvenience in making the change from one to the other.

Ordinarily enough men are so located as to make sure that prices to be obtained in the leading markets are never for long far apart. If, for example, the demand for condensed milk were suddenly greatly increased, the price for that commodity would go up, and condensery districts would be able to outbid nearby city markets, with the result that milk formerly going to the latter would go to the condenseries and thus force city prices to higher levels. This might work itself out through scattered individuals, or through the threats of a whole group on a certain route to go to the competing market. Exactly such conditions frequently obtained during 1916, 1917, and 1918, when the condensed milk market was so uncertain that condensers frequently found themselves able to pay very high prices at one time, and thus to draw on city supplies, only to be confronted by the danger of serious loss at a later date, whereupon the reverse movement took place. Condenseries in normal times, it might be said, have difficulty in competing with the city milk trade, since their products, produced from milk purchased near a large city, must sell

on the open market in competition with similar products produced where milk can be purchased more cheaply. This was illustrated in the Chicago dairy district in the spring of 1916. During a period in which prices are adjusting themselves there may be wide differences in the net returns obtainable in the various markets, and the alert farmer can materially benefit by selling in the right market. The more alert the producers as a whole are to relative changes in market demands, as expressed by market prices, the more quickly will prices in the various markets become adjusted.

Although a creamery can seldom outbid a city for the milk near the city, it can readily compete farther out. Creamery prices are lower than city prices, but they are for only a portion of the milk. The farmer has his skim milk to consider in addition. Where there is young stock to be fed, skim milk has a value variously estimated at twenty-five cents to one dollar a hundredweight, which thus easily brings the returns to a point where they approach or equal those for whole milk. Moreover, cream need not be marketed every day, and hence the man who sells cream saves a trip to the creamery or milk plant at least every second day. In fact, in many parts of the country, where the centralizer method predominates, cream is often kept a week or more in cool weather. Because of the fact that cream can be hauled profitably much longer distances than can milk, creameries thrive in more sparsely settled communities than do cheese factories or condenseries.

Prices paid by cheese factories are usually somewhat higher than those paid by creameries, but, instead of having the skim milk for feed, the farmer gets only the whey, which has less feeding value. Moreover, there is the

greater expense of daily delivery of the milk and the return of the whey. Farmers seldom find it profitable to haul farther than from three to five miles to a cheese factory, and indeed the latter distance is rather unusual.

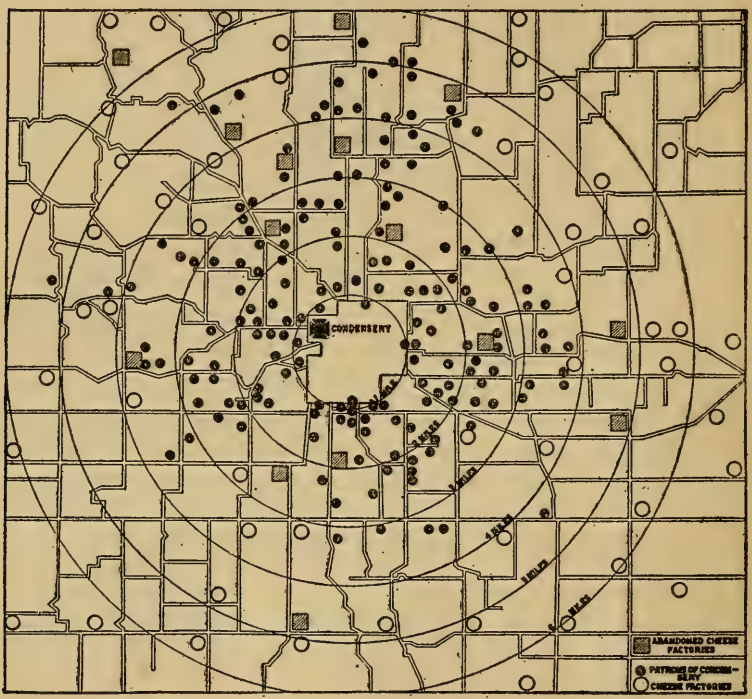

FIG. 5.—A Condensery and Its Patrons. Prepared by L. G. Foster for Wis. Agr. Exp. Sta. Bul. 285.

There is scarcely a town of any size that does not have one or more ice-cream factories. Such a factory may be operated in connection with a city milk plant, a creamery, a candy factory, or an ice-cream parlor, or it may be a separate plant. Ice-cream factories usually pay somewhat higher prices than do creameries. The demand for ice

cream fluctuates very widely with weather conditions or gala days. Hence the manufacturers cannot contract for a regular supply, but must buy large quantities on short notice and not infrequently find it necessary to cancel orders because of sudden changes in weather conditions. Large factories, of course, make some ice cream at all times; but, on the whole, the ice-cream factory is not so stable a market as the others, and for this reason many ice-cream makers now obtain much of their cream from various creameries, paying enough to cover additional handling and transportation charges and yet leave a profit for the creamery at least equal to what it would have made by turning the cream into butter. Milk dealers and producers for the city market cannot usually profit much by the sale of surplus milk to the ice-cream trade for the reason that the heaviest demand for ice cream comes at the very time when there is a shortage in their own supply.

Section 3. The Export Markets for Milk

The exports of milk are confined almost entirely to the various powdered, condensed, and evaporated milks. Prior to the outbreak of the World War milk exports played a minor part in the milk business of the country, but the unusual demands of the past few years have caused the American condensed milk industry to flourish remarkably.

The principal pre-war markets were the North American countries of Canada, Mexico, Cuba, and Panama, whereas of recent years the major exports have gone to Europe. Pre-war condensed milk exports were distributed as follows for two typical years: [1]

[1] The Foreign Commerce and Navigation of the United States, 1912, p. 719; *Ibid.* 1913, p. 585.

	1912	*1913*
	Pounds	*Pounds*
Europe	1,204,317	11,699
North America	10,365,580	9,865,563
South America	531,314	596,449
Asia	4,955,635	4,147,284
Oceana	3,073,990	1,366,384
Africa	511,902	538,579
Total amount, pounds	20,642,738	16,525,918
Value	$1,651,879	$1,432,848

Beginning with 1913 the exports increased at a phenomenal rate year by year, as is shown by the following figures:

	Pounds
1913	16,525,918
1914	22,831,904
1915	75,689,584
1916	219,444,018
1917	428,575,213
1918	551,139,754
1919	852,181,414

The largest single foreign customer in 1919 was the United Kingdom, which took over 420,000,000 pounds. It is noteworthy that although there were such tremendous gains in the business as a whole, the markets nearest home—the North American trade—increased their demand but little. Only about 11,000,000 pounds went to these markets in 1919 as compared to about 10,000,000 in 1912 and in 1913. The South American trade appears to have been even more neglected, since it is not mentioned at all in the commerce reports except as included in the "other countries." [1] Following is the list of countries to

[1] *Monthly Summary of Foreign Commerce of the United States*, Dec., 1919, p. 51.

which condensed milk was exported in 1919, together with the amount exported to each:[1]

	Pounds
Belgium	61,596,636
France	114,818,165
Netherlands	11,821,267
United Kingdom	420,928,450
Canada	4,578,983
Panama	3,599,564
Mexico	2,946,455
Cuba	33,461,993
China	5,555,679
British India	10,130,675
Straits Settlements	6,444,295
Hongkong	2,269,288
Japan	4,123,127
Philippine Islands	14,085,937
British South Africa	1,025,731
Other countries	154,795,169

[1] *Monthly Summary of Foreign Commerce of the United States*, Dec. 1919, p. 51

CHAPTER IV

DISTRIBUTION OF MILK

Section 1. Collection of Milk from the Farmers

THE collection of milk from the farmers may be considered under two heads, the direct method and the indirect method. In the case of the direct method the milk is brought right from the farms to the city milk plants. In the smaller centers the more common way is for each producer to bring his own milk to the plant or perhaps for two or three producers to coöperate by taking turns at hauling. This method often results in a great amount of unnecessary duplication. Jennings [1] cites an instance where fifty men and wagons using sixty horses were employed to bring to a central plant milk which could have been delivered by twelve men and wagons with twenty-four horses. Not only would coöperative delivery or delivery by a single trucker have saved the time of a considerable number of men and horses, but the unloading at the plant would have been facilitated, since one large load may be unloaded much more rapidly than many small ones. As a result of these possible economies, the tendency is more and more to have the milk brought in by men who make a business of hauling. Where an individual farmer will haul three or four cans, such a hauler will haul from twenty to fifty ten-gallon cans, and an auto truck will often double or treble that quantity. In some

[1] Jennings, I. G., *A Study of the New York City Milk Problem*, p. 17.

sections the producers themselves are beginning to insist that all the milk be taken to the plants by such route men, in order (1) that there may be less delay at the plant, and (2) that the milk may be more cheaply hauled because collected in larger quantities without extra travel.[1]

Even in the larger centers, large proportions of the milk are frequently brought in by wagon or truck. In the summer of 1916 over 56 per cent of Milwaukee's milk supply was being brought in in this way.

In many instances the trucks used for hauling are operated by the milk companies themselves, in order to assure a steadier supply of milk. In other instances the drivers are hired by the companies and all or a part of their pay is deducted from the farmer's milk check at the end of each pay period. Recently, however, numerous instances have been reported in which producers themselves have owned and operated motor trucks. Several such are to be found in the neighborhood of Baltimore, Maryland, where coöperative companies have been organized for this purpose.[2] Most commonly, however, the milk haulers, whether operating by team or by motor truck, are more or less independent of either producers or company. They operate for a given charge per can, which charge varies rather widely from community to community, depending upon the amount of milk hauled regularly, the kind of roads, and the distance hauled.

As cities are compelled to reach out farther for milk, larger and larger proportions of the direct shipments are brought in by steam or interurban lines. Though the development of milk carrying by electric railroads is com-

[1] *Dairymen's Price Reporter*, Jan. 5, 1920, p. 2.

[2] *U. S. Farmers' Bulletin 1032; Bulletin No. 1*, Firestone Ship by Truck Bureau, Akron, Ohio.

paratively recent, it has reached considerable proportions in some of the cities, especially in those of medium size. In the larger cities a great proportion is brought in by steam road.

By the indirect method milk passes through a country cooling station, pasteurizing plant, or pasteurizing and bottling plant before going by railroad or truck to the city. Often such country plants are merely cooling stations for properly chilling the milk before it is brought to the city for the pasteurizing and bottling processes. In many other instances, however, the country plants are fully equipped for pasteurizing and frequently for bottling as well. Both Chicago and New York receive large quantities of milk daily which have been pasteurized and bottled at country plants.

It may seem like unnecessary expense to have milk handled at country plants when a certain amount of milk plant accommodation is still necessary in the city. The principal reason for having such plants is thus stated by Parker:[1] "The chief reason for maintenance of country milk plants is found in the vital principle of the North system, namely, that a single central plant is needed in the dairy district to collect, pasteurize, standardize, and store the milk and to clean and sterilize the tinware used by the farmers, it being unreasonable to expect them to do this work because they have not the training for it and because of the unnecessary expense that would be incurred should each farmer invest in the requisite apparatus and expend time and labor in preparing his milk for market that can be greatly economized by handling the milk of all the farmers together. In fine, better milk is obtained through the country milk plant system than under that

[1] Parker, H. N., *City Milk Supply*, p. 238.

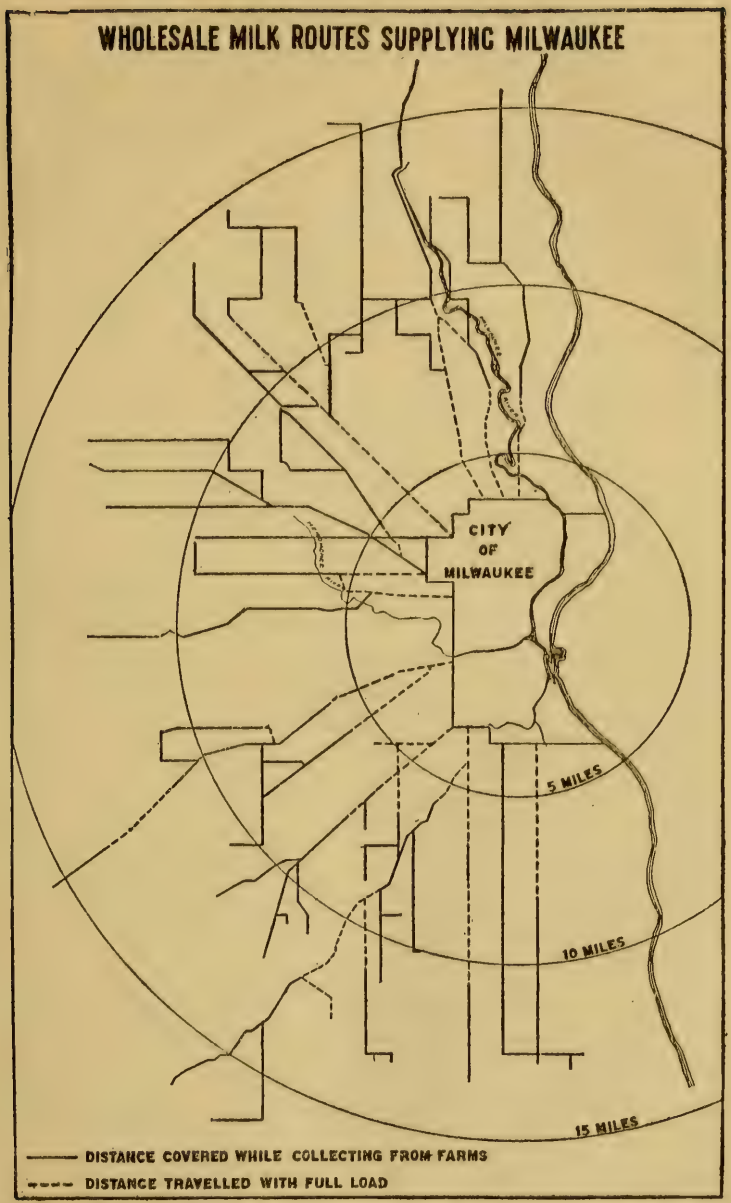

FIG. 6.—Wholesale Milk Routes Supplying Milwaukee, 1916. From Wis. Agr. Exp. Sta. Bul. 285.

of city plants. In some cities like Chicago with the dairy districts at their very gates, the city plants have largely disappeared; practically all of the milk being shipped in bottles from the country to the city."

The limitations of the country milk plant are thus described by the Wicks Committee in its report on the New York district in 1916:[1] "The auditor's report made to this committee from the books and records of certain distributors established the proposition that market milk can be handled, clarified, pasteurized, and bottled at the country station at a lower cost than the same work can be done in the city plant. On the other hand, the milk distributor asserts that the business of the large distributing companies cannot be successfully handled through the operation of a large number of small country plants. They contend that the operation of two or three country plants, where a less cost of pasteurization, etc., is shown, does not afford a just basis of comparison as to what the costs would be if all the business of the large companies was attempted to be handled in that way. The testimony of the larger distributors is to the effect that it would be impractical and impossible to carry on their business satisfactorily by buying their daily supply through out the year from a great number of coöperative plants managed and conducted by the dairymen, because of the fluctuating and varying needs of the business and the uncertainty of the supply at different seasons from various country stations so controlled. In other words, their contention is that if all the milk now handled at the central city plants was attempted to be handled by them in their own plants at the shipping point, it would require

[1] *Preliminary Report of Joint Legislative Committee on Dairy Products, Livestock and Poultry*, p. 599.

great duplication of apparatus and labor at many points. At some seasons, this apparatus and labor would be idle; at others it would be over-burdened; and that in considering the entire volume of business, it is far more economical to gather the milk at the central city plant in the required amounts and prepare it for market as a whole for a day's supply, instead of attempting to accumulate or prepare from many various sections."

In many sections there is a strong movement for the ownership of these plants by the producers themselves, so as to make them more independent of the city dealers. This is being urged in the Boston district [1] and in the New York district, where some country milk plants are now owned and operated by producers and where an elaborate plan is under way for the ownership of a considerable number of them. On the Pacific coast the dairymen are in numerous instances erecting so-called utility plants, which are really country plants equipped to care for the surplus in whatever way necessary when not all the milk is needed in the city. The coöperative ownership and operation of country plants will be further considered in Chapter V.

In many instances considerable quantities of milk are collected for the city supply by country creameries, cheese factories, and condenseries, which are so equipped as to be able to prepare milk for city use and whose contracts are such that milk can be diverted to the city as occasion demands and at other times worked up into one of the numerous milk products. At the outer edge of the milk zone of practically every large city may be found such establishments. One hindrance to such arrangements as this, however, is the fact that in many cities the board

[1] *New England Dairyman*, Aug., 1917, p. 1.

of health requires that all farms producing milk for a plant must be inspected before the milk of that plant can enter the city. This is a safeguard for the consumers, and it is certainly only fair to those producers who have gone to the extra trouble and expense of complying with city regulations to require that men outside the regular zone also comply with these regulations before being allowed to send milk to the city.

Section 2. Railway Transportation of Milk

As railroad transportation of milk to a large city becomes necessary, a few cans are picked up at stations along the line and hauled as baggage. As the milk business increases along such a line, however, the space allotted to milk becomes insufficient, and a special car is necessary. Still later, when enough milk comes to be shipped from certain stations to fill or nearly fill a car at a single station, cars are set out at such places to be picked up by the morning train, and, if not entirely filled, they are filled at the next two or three stations, where lesser supplies of milk have usually accumulated on large platforms and are quickly transferred to the car by farmers and railroad employees. Fully 25 per cent of the New York milk supply originates at points where entire car lots are thus started.[1] As the milk business increases still further, so-called special trains run into the city. In 1916 twenty-one such trains, composed of from eight to twenty-five cars each and running from 49 to 295 miles without a stop except for orders, etc., were serving New York City.

Refrigeration is usually furnished by the carriers for the less than car lot shipments, which in most instances

[1] *Interstate Commerce Commission Docket No. 8558, Brief for N. Y. Sanitary Dealers*, p. 77 (1916).

constitute by far the greater proportion of the milk supply, whereas in the case of the carlot shipments originating at country plants it is more usual for the milk company to do its own icing. Though in many instances refrigerator cars are used, the more general practice is to use ordinary baggage cars for the pick-up service.

Up to 1917 the railroad companies in many of the dairy sections commonly leased cars to the large milk companies. This practice, however, gave some of the large companies an undue advantage, as was shown by the investigation of the Boston Chamber of Commerce in 1915, which produced evidence that in most sections supplying Boston with milk there was no competition, owing to the fact that one company would run a leased car along a given railroad, thus practically limiting the producer's market to the plant of a single dealer, since the producer could not afford to ship elsewhere at the higher rates charged for less than carlots.[1] A case brought before the Interstate Commerce Commission resulted in the abolition of the leased car system October 1, 1916.[2]

Around all of the larger cities where the milk belt lies a considerable distance outside the city, concentric circles have been drawn about the city dividing off so-called milk zones. One circle may have a radius of sixty miles, the next a radius of eighty miles, and the next a radius of one hundred miles. All milk coming from between the sixty and the eighty mile circles would then take the same transportation rate, whereas milk coming from between the eighty mile and the one hundred mile circles would all take

[1] *Investigation and Analysis of the Production, Transportation, Inspection and Distribution of Milk and Cream*, by Boston Chamber of Commerce, July, 1915.

[2] N. H. College Extension Bulletin, No. 8, p. 17, *A Survey of the Dairy Marketing Conditions and Methods in New Hampshire.*

a somewhat higher rate. Such zones have been established around Boston, Philadelphia, New York, and other eastern cities. Chicago, however, has no such zone rate. For larger cities the zone system is usually considered desirable, since it facilitates the establishment of milk price quotations.

Section 3. The Middleman Function

One can scarcely pick up a paper or magazine without finding therein a tirade against the middleman wherein the language varies from moderate criticism to such denunciatory adjectives as "unscrupulous," "greedy," "preying," "robbing." One might well gain the impression widely prevalent that the middleman is at best an unnecessary evil; that he places himself at the gate through which the necessaries of life must pass on their way from producer to consumer and lets nothing go by without taking his toll. As a matter of fact, however, the middleman performs a function which is as needful and which is as truly a service as production itself. Indeed he does actually produce when he adds value to a commodity by placing it at the consumer's door at the moment when wanted and in the quantity desired. This, being true of commodities in general, is all the more true of milk, a perishable commodity which must for the most part be consumed within forty-eight hours from the time that it is produced. Some few persons can, of course, obtain their milk directly from the producer. This is done to a small extent in every town. Perhaps an occasional consumer with no pressing duties gets his daily supply from a neighbor after the milking hour, or perhaps a farmer on his way to a condensery or creamery leaves a can or a bottle of milk at a few homes in the city, or possibly, as in the case is most small towns,

a nearby farmer makes it a business to peddle milk to some of the residents of the town. But in our cities there must be for most consumers some sort of a middleman.

There are two main methods of distributing milk, direct and indirect. In the direct method the producer himself or his hired employee delivers the milk to the consumer, or the consumer himself gets it from the producer as described in the preceding paragraph. In the indirect method the producer sells the milk in bulk or even occasionally bottled to a middleman, who puts it through the various necessary processes on its way to the consumer. It is relatively seldom that a second or a third middleman enters, though often this does occur in the larger cities. For example, for many years a firm in Chicago did a large business in placing farmers' milk and in making collections therefor. More recently many producers' associations have undertaken this function in various cities, thus assuring their members of a more certain market and at the same time making substantial gains through better selling and closer collections. In every city there is more or less dealing in milk between dealers,—a so-called horizontal movement, which is only a method of equalizing supplies so that dealers temporarily short can get a supply from dealers temporarily long on milk. In the main, however, there is only one middleman. The larger any given city grows, the greater comes to be the distance between the consumer and the producer, and the more necessary does it become that there be an efficient middleman to take the milk of producers, bring it to the city, and distribute it. Only a small fraction of the producers about many of our large cities could to-day deliver their own milk to the consumer, and most of those could do so only at a much greater expense than it is now being done.

In a village or small town, the milk is often delivered before it is more than one or two hours old, being delivered twice a day. If only a morning delivery is made, evening's milk is then about twelve to eighteen hours old at time of delivery, but in most cases of indirect marketing, the evening's milk is at best about thirty-four to forty hours old and the morning's milk at least twenty-two to twenty-eight hours old at the time of delivery.

In nearly every city a considerable quantity of milk is marketed through the stores. In Eau Claire, Wisconsin, where a careful survey was made of the stores in 1916, 36 per cent of the city's milk was found to be sold in this way. In Columbus, Ohio, in 1919, about 35 per cent was handled by the stores. In New York City the same year about 5 per cent was sold through the stores bottled, and about 30 per cent was sold through stores "loose," that is, in bulk, dipped into any vessel the consumer might happen to bring to the store.[1]

Practically every writer on the milk problem refers to the fact that with our present competitive system of distributing milk, there is an unnecessarily large amount of duplication. Not only are there often more men engaged in the business of delivering milk than are necessary, but each has more machinery and general equipment than he needs in handling his business, that is, each could usually handle more business without an increase in his fixed investment. Moreover, almost without exception the dealers are charged with gross inefficiency. A personal acquaintance with any of the accused dealers, however, reveals the fact that they measure up very favorably with other men of big business, which leads one to wonder if,

[1] *Report of Fair Price Committee of the City of New York*, 1919, Legislative Document, No. 29, p. 46.

after all, there is not another side to the mooted question, and whether the constant effort to reduce costs in order to increase profits does not in large measure offset the apparent wastes of competition.

Section 4. Direct Marketing

In our smaller cities and towns practically all milk is retailed by the producers themselves. The same practice is followed to some extent even in the larger cities. In Columbus, Ohio, for example,[1] perhaps 5 or 10 percent of the milk is still brought in by producers. No hard and fast line can be drawn, however, between direct and indirect marketing, since almost every producer who distributes his own product finds at certain seasons that he cannot supply the demand without buying additional milk from a creamery, a milk plant, or from neighboring producers. In the main, however, the division is fairly clear.

On the outskirts of a town one often finds a producer with one or several cows who delivers on foot to neighbors, or a city dealer may have one or more cows from which milk is delivered to neighbors in the immediate vicinity, often by a boy or girl, who does the work before going to school. In some instances milk is delivered by producers on their way to a creamery or cheese factory. In other instances the consumers themselves go for the milk, some going in the morning, others at night, or perhaps some going both morning and night. When the consumer calls for the milk, the price is usually a cent or two cheaper than if the milk is delivered.

The methods of delivery in direct marketing vary from delivery on foot or with a small express wagon, as fre-

[1] A city of about 225,000 population.

quently seen in villages, to delivery by covered wagon or motor truck. Where the producer lives some little distance out from the city, use is ordinarily made of a delivery wagon of some sort drawn by one or two horses. Occasionally one finds an auto truck or a touring car in use for this purpose. The auto truck has been found particularly useful by men living farther out or men supplying a special grade of milk, which must be disposed of to customers scattered all over the city. There is as a rule but one delivery outfit, and that is most frequently operated by the owner himself.

Equipment for direct marketing varies from a few milk cans, a strainer, and a dipper in the producer's kitchen to an elaborately equipped milk house such as one often finds in the case of men producing special grades of milk. Most commonly, however, there is some sort of milk house near the well, containing a bottler, perhaps a bottle washer, a supply of bottles and bottle cases, and often a cream separator for skimming surplus milk. An ice house is usually felt to be a necessity, inasmuch as a regular supply of ice is not likely to be available from other sources.

The methods of handling milk in preparation for marketing are also simple. Where the practice is to sell milk unbottled by dipping from the can, the milk is merely strained into cans, which are placed in cold water to cool, or it may be strained, passed over a cooler, and then put into cans for delivery. In most communities at the present time the greater proportion of the milk is sold in bottles. In this case it is strained, cooled—either by being put into cans set in cold water or by being passed over a cooler,—and then bottled. The bottles are then iced for delivery.

The surplus and shortage problem is seldom a serious

one to the man marketing directly. A small amount of extra milk is obtainable from a neighbor, if city regulations are not too stringent to allow of this practice, or milk can be obtained from some other milk man or from a creamery. A surplus can usually be disposed of at the same creamery, or it can be skimmed and fed to young stock, in which case the cream is sold bottled to customers or in bulk to a creamery or ice-cream factory, or is made into butter on the farm.

Under direct marketing the milk peddler is faced with certain difficult problems. In the first place, the producer peddling his own milk spends much of his time in town, thus neglecting during that period his farm work or intrusting it to hired help. On the other hand, if he attends to the farm work himself and intrusts the milk route to hired help, he has the difficulty of preventing fraud or dishonesty, and of keeping customers satisfied and having the work efficiently performed.

Around our large cities direct marketing is being forced out because the length of the drive to the city becomes too great to be made regularly with a small load. The dairyman cannot afford to erect the kind of buildings required by health regulations on high-priced land which is likely to be needed for factories or homes in the immediate future. If he goes out to cheaper land, however, he is likely to be five or six miles or more from the city, in which case he can hardly afford to take the daily trip to peddle his own milk, unless he is a producer of "special" milk. Around a city like Milwaukee there are very few dairymen within five or six miles of the city proper.

The producer of special milk would seem at first glance to have some advantage in selling by the direct method, since he can get a somewhat higher price. After he has

worked hard to build up a trade, however, he usually finds that he has difficulty in holding it, first, because it is not an easy matter to get help which will care for milk equipment and do the milking in such a way as to keep a uniformly high standard of quality regularly, and, second, once the demand for a high-grade milk has been established, it is always relatively easy for a competitor with milk claimed to be "just as good" and offered at a few cents less to attract some of the customers, thus dividing up the business and perhaps making the route unprofitable. This is particularly true because the demand for a high-grade milk is limited.

It is sometimes suggested by writers in our daily papers and elsewhere that we go back to the direct method of distribution. Even though it were possible to produce sufficient milk within a reasonable driving distance, such a change in a city like Columbus, for example, would mean more expensive rather than cheaper milk, since it would bring about the extreme of duplication. At present we have several dealers each with the city nicely parceled off so that his delivery-men have certain small areas to cover. Under direct distribution we should have each of many producers seeking customers wherever he could find them, driving over long routes and frequently crossing the routes of other producers. Since producers distributing their own milk usually sell at the same price at which other dealers sell, one would think that if they were making a large profit, more farmers would take up the marketing by that method. As a matter of fact, however, the number has been gradually decreasing.

That it is possible, however, for an individual to enter the business and maintain a trade even under adverse conditions is shown by the fact that a few men are always

found successfully distributing their own milk. A producer wishing to do this usually starts business by cutting prices during the summer months when prices are low. At first he may have to sell to scattered customers. By having a high grade of fresh milk at a somewhat lower price than his competitors, he can usually retail all he has. If there is a surplus, this can ordinarily be sold to stores. As soon as his trade is firmly established, he increases his price nearly or quite to that of his competitors. The next step is to try to consolidate the route by dropping here and there an outlying customer and picking up more in a solid district, thus eliminating the long drives, particularly during seasons of shortage. Building up a route by this method is certain to cause large competitors considerable annoyance, to say the least, and the fact that it can be done and is being done is a practical guarantee against monopoly prices in our smaller towns and even in cities of considerable size, although of course not in our larger cities, since there are not enough farmers producing milk within driving distance of the latter to afford a serious hindrance to monopoly.

Section 5. Indirect Marketing

In most of our cities of any size, the indirect method of marketing prevails. In Milwaukee perhaps 97 per cent of the fluid milk supply was thus marketed in 1916. In the larger cities of Ohio 85 to 95 per cent falls into this class. In the smaller cities, those of from fifteen to thirty thousand, the percentage usually varies from 25 to 75 per cent. In our very large cities the direct method of marketing is practically unknown.

With the rise of the indirect method of marketing, the relations between producer and dealer become compli-

cated and require frequent adjustment. The most usual contractual relation between producer and dealer is one which provides that the dealer is to take all of the milk produced during a given period of time. Prior to the present unsettled conditions arising out of the war the most usual contract period was for six months. Commonly one six months' period included the winter months and the other six months' period the summer months. During the past two or three years, however, neither producers nor dealers have as a rule been willing to contract for longer periods than one or two months at a time. Though there are often no definite contracts, the large dealers usually ask their patrons to sign agreements going somewhat into detail as to number of cows supplying the milk purchased, method of handling milk, method and condition of delivery, and prices. Recently in many cases contractual relations have been established between producers and a selling agency of their own, which in turn contracts with the city dealer. This development will be further discussed in the chapter on Coöperation.

The financial relations between farmers and dealers have been the cause of frequent contention. Payments are usually made once or twice each month, more frequently the latter, although in the case of many of the large plants, payments are made but once each month. With many of the latter there is a tendency to postpone payment long enough after the half month or month has elapsed to allow for the making up of all the statements of the numerous patrons. Consequently many of these concerns do not pay until two or three weeks after the last delivery has been made under a given pay period. One such company, for example, pays on the twentieth of the following month. The claim is made that were payments

to be expedited to the extent of settling within a few days after the close of the pay period, it would mean a tremenduous expense for extra clerical help, which would ultimately have to come out of the price paid to the producer.

The financial standing of the dealer is a question of considerable concern to the farmer. Attempts have been made to protect the producer through laws requiring that dealers be bonded. New York at present has such a law, as have also several of the New England states. In many sections producers' associations have taken up this function and are placing on the blacklist dealers who are slow pay, so that in some instances such dealers have had to pay a few cents extra in order to get milk at all. Dealers who are financially weak have frequently been known to fall farther and farther behind in their payments, ultimately going into bankruptcy owing the producers for two or three months' milk. Small dealers in many of our cities have been especially troublesome in this way. A good part of this difficulty would be obviated if farmers were more generally to make use of the various commercial credit rating agencies when they do not have an agency of their own.

In some sections of the country the dealers own the milk cans. This has been particularly the case in the New England states, where it has been said that "if three great milk companies . . . should withdraw their cans from the milk service, thousands of tons of milk would perish in the country, while hundreds of people in the city would be going without. . . . The dealers might almost as well own the cars." [1] Such an arrangement is usually unsatisfactory and expensive. Aside from the

[1] Pattee, Richard, *Circular 79*, Massachusetts State Board of Agriculture (1918), p. 8.

dependence of the producers, the dealers' cans are not given proper care while in the hands of the farmers. This means unduly rapid depreciation of the cans, with consequent increased expenses. In numerous sections of New England at the present time a can charge is regularly made by some of the larger companies.[1]

With the development of the indirect method of marketing, we have the entrance of an intermediary,—the middleman. He may be a very small dealer, one man buying the milk from two or three farmers, doing all his own bottle washing, filling, etc., delivering in the morning and doing the bottling and other work later. Most of the small dealers of our cities operate but one route each. They frequently have an extra boy or man to help about the bottling plant. Varying from this small dealer are other dealers with larger and larger businesses, until we reach the very large concerns, operating hundreds of wagons. In Milwaukee in 1916 there were 77 dealers operating routes as shown in the following table:

TABLE XV

Table Showing Number of Routes Operated by 77 Milwaukee Milk Dealers, April, 1916

No. of routes	*No. of dealers*	*Total no. of routes in group*
1 to 10	71	152
11 to 20	3	50
Over 20	3	238
All dealers	77	440

In the spring of 1920 the number of dealers had been reduced to about thirty-five. The largest of these was oper-

[1] Pattee, Richard, *Circular 79*, Massachusetts State Board of Agriculture (1918), p. 9.

ating 242 routes and was supplying milk to about 55 per cent of the families of the city, and the two dealers next in size were operating about forty routes each.

Once the milk business has reached the stage where such large quantities are distributed by a few dealers, a high degree of systematization is necessary to conduct the distribution efficiently. Milk arrives at the plant in large volume at a certain hour of the day and must be processed and entirely out of the way before the next day's supply is due. It must also be ready for delivery each day at a certain time, for there is no reserve of bottled milk to fall back upon in case the new supply is held up at any stage. The whole distributive organization must work in unison if the distribution is to be made with efficiency and dispatch. That this is true becomes apparent when one considers the distribution from the point of view of what each of the various operations implies.

The receiving of the milk at the plant door, simple as that may seem, requires system in order that the hundreds or in many cases thousands of cans can be received, examined or sampled, and weighed in the course of a few hours each morning. Then there is the matter of keeping straight the records of a great number of individual producers, which records must show each individual's tests and weights. Every mistake means complaints and the possibility of accusations of dishonesty and other misunderstandings.

Putting the milk through the various stages is alone an elaborate process. In a small plant the system of handling may consist of a few simple steps. They may be: (1) weighing the milk, if it is purchased by weight; (2) straining into the filler supply can; (3) bottling; (4) capping by hand; (5) transferring bottles to wagon ready

for delivery, or, if delivery is made the following morning, transferring to a refrigerator; and (6) delivery; or the milk may pass from the weigh can to a pasteurizer supply can, thence to a pasteurizer and to a cooler before being bottled.

In big city plants the whole process is more complex and is usually accomplished by larger and more efficient machinery. Here the milk is received in a special receiving room, where it is inspected. It is then strained into a weigh can, weighed, and, when purchased by test, sampled for further testing. From the weigh can it is often pumped to the upper floor of the plant into a supply tank, in order that gravity may be used in all further transfers. From the supply tank it passes to the pasteurizer. Three systems of pasteurization are in common use. (1) The flash system is perhaps the most frequently used. Under this system the milk is heated from 145 to 160 degrees Fahrenheit for an instant and then passed over cooling pipes. (2) The holding system requires that the milk be heated to about 145 degrees, usually by means of the pasteurizer employed in the flash system. In contrast to the flash system, the milk, instead of being cooled at once, is held at 145 degrees for thirty minutes. This system is perhaps the best in common use. Apparatus has been devised which automatically holds milk for the required time in such a way that although it enters and leaves the pasteurizer in a steady stream, successive compartments are filled and then emptied after their contents have been heated and held the required time. Pasteurizing at 145 degrees and holding for thirty minutes does not appreciably change the chemical composition of the milk, nor does it injure the cream line. The Chicago Board of Health, as well as the boards of health in many other

cities, requires the use of such a system. (3) The third system is that in which the milk is heated in a vat and held the required time. After being pasteurized and cooled, it passes to a tank supplying the bottler. A fourth system, pasteurization in the final container, is generally considered too expensive a process for present market demands, although it has been shown to be the most desirable method on account of its effectiveness, since no contamination is possible after pasteurization.

In the larger city plants there are usually several bottling machines into which cases of empty bottles are fed at one end and the cases of filled and capped bottles removed at the other end. The cases of bottles are then stacked up in the refrigerator ready to be taken out for delivery the following morning. So efficient are some of these plants that a given quart of milk passes from receiving room to refrigerator in something like forty minutes, even with the use of the holding system.

In the country bottling plants, the process is similar to the above, except that the filled cases are stacked up and thoroughly iced in a refrigerator freight car ready for shipment to the city in time to arrive there by early morning, when delivery-men begin to load their wagons.

Keeping check on several hundred delivery-men is another problem in a large company, since the method must be such as to protect the company's interests as well as to insure proper treatment of the consumer and to keep the good will of the driver. Still another problem which any large concern must meet is that of getting its bottles returned, for a lost bottle, costing four or five cents, means the profit on ten to twenty quarts of milk at least. Then there is also the question of keeping up collections on hundreds of small accounts with consumers and on the larger

accounts with wholesale customers. This phase will be considered somewhat more in detail in a later section.

In the milk business there has been a pronounced tendency towards centralization. From every part of the country reports indicate that in the past decade there has been a very great decrease in the number of men distributing milk, in spite of the fact that the cities have been growing and that the milk business as a whole has been increasing fully as rapidly as has the population. Thus in New Haven, Connecticut, which in 1903 had a population of 108,027, there were about two hundred milk routes. In 1916, with an estimated population of 170,000, there were only one hundred sixty routes,—that is, an increase of 57 per cent in the population was being served by 20 per cent fewer wagons.[1] In many instances a reduction in number of routes has taken place as a result of a dropping out of some of the smaller dealers and of the absorption of some of the larger ones by still larger companies, or by a combination of several of the leading companies. These combinations have almost invariably been accompanied by decreased operating expenses or at any rate by decreased duplication in the delivering. A typical example is that of Springfield, Ohio, where in 1918 the two largest companies, each operating eighteen routes, combined. Within six months after combining, the number of routes had been reduced from thirty-six to thirty, although the amount of business in that time had actually increased. Similar instances might be given for other cities.

The question then arises, can the small dealer withstand the competition? If so, how does he do it? In the first

[1] Weld, L. D. H., *Marketing, City of New Haven*, 1916, p. 37; Alvord, H. C., *Milk Supply of Two Hundred Cities and Towns*, p. 54, 1903.

place, he works long hours. This was almost universally true in Milwaukee in 1916. It is true in Columbus and in other Ohio cities now. The small dealer is usually delivering in the early hours of the morning, along with his competitors. Later in the day he is about the plant, assisting with the preparation of the milk for the following day, and still later in very many instances, he is doing what little bookkeeping he finds necessary. Thus the working day of some of these dealers is easily from twelve to sixteen hours in length seven days in the week.

In most cases the duties of the business are largely performed by the proprietor himself or by his partners and himself. The writer has in mind, for example, two unusually successful small companies in Milwaukee, Wisconsin, each composed of several brothers. Several Columbus concerns are also composed of small groups of men, each of whom has a direct interest in the company. In all of these instances every member of the firm is working for new business and each is anxious to stop all leaks of whatever kind. Although such hired labor as they find necessary may work only the regulation city work-day the members of the company themselves are willing to work for long hours in a pinch, and in many instances do so regularly. Furthermore, men so vitally interested in the business, doing largely their own work, are more ready to get along with inferior equipment than are hired employees.

In some of these smaller plants cheap labor may be and is used. This is made possible by the fact that members of the family may be utilized for so large a proportion of the work and to the fact that unskilled labor can be more readily depended upon, since it can receive close supervision. Illustrative of the first point is the fact that in Kansas City in September, 1918, 28.5 per cent of the per-

sons engaged in bottling and delivery "were either the employers themselves or connected with the employer's family and did not receive a stipulated compensation for their services." [1]

Another explanation of the small producer's staying power is the fact of a very low overhead expense. There is seldom much of an office force, very often none at all. The investment in equipment is commonly low, due to the fact that there is relatively little equipment and that often of an obsolete and inferior type. The Massachusetts Experiment Station found that although there was relatively little direct correlation between the size of business and cost of operating, yet the investment increased very rapidly as the size of the business became larger. Thus "an increase from an average of 360 quarts per day to an average of 710 quarts a day seems to multiply bottle investment nearly six times." [2] The real estate investment is usually relatively low. These small plants very frequently operate on a back half lot. At least seven such concerns in Columbus occupy that portion of lots which adjoins the alley, the front part of the lot being in each case occupied by a house, a store, or other building.

The small dealer also economizes by practically avoiding the surplus and shortage expense. He accomplishes this by supplying as nearly as possible his actual needs for his fluid milk trade through the selection of a few producers here and there whose production is more regular throughout the year than is that of the usual run of farmers. Quite often he is compelled to pay somewhat of a premium

[1] Barber, W. H., *Milk Marketing Conditions in Kansas City, Sept., 1918*, p. 61, U. S. Bureau of Markets, unpublished.

[2] Massachusetts Experiment Station Bulletin 173, *Cost of Distributing Milk in Six Cities and Towns in Massachusetts.*

for the milk of these producers, but such premium is offset by the fact that he does not have a large surplus to care for in the summer months nor a large deficit to make up during shortage periods in the fall. In the case of shortage two methods are at hand. He may go out and pay whatever price is necessary for the small amount of extra milk needed. Very often this means only the purchase of a few extra cans from one or two farmers. Or he may buy from another dealer, although this is not usually possible during shortage periods. The small dealer can more easily take on and drop patrons. Some of the Columbus dealers, for example, quite frequently pay one farmer one price and another a different price for the same grade of milk. The large dealer, on the other hand, has an established price from which he can less easily vary. Another method by which a small dealer may meet a shortage is that of sending his delivery-men out with only a part of a load in the early morning, then sending them out with the balance of the load after some of the day's milk has been received from the farmers, pasteurized, and bottled. Thus by making some deliveries a few hours late, he can tide over a temporary shortage.

Section 6. The Delivery Problem

The delivery problem has been so prominent in discussions of the milk question that it seems worth while to consider it at some length. The usual method of delivery in most American cities is by horse and wagon. For city delivery to the homes one horse is ordinarily used, although in the case of direct marketing delivery is often made with a two-horse outfit. For the wholesale trade the motor truck is coming to be quite generally used. Thus far it has not come into common use for retail delivery except in

the case of special milk. Men making a specialty of high-grade milk frequently have customers scattered rather widely over the city, which necessitates longer routes. A small Columbus dealer has used a two-ton truck for several years for retail and wholesale deliveries combined, but has not found it especially desirable for the retail trade. Too much time is lost in starting and stopping. With horse delivery, on the other hand, a horse soon learns the route and keeps moving for some time after the driver is well on his way to the house where he delivers milk. In fact, the horse and driver may meet some distance farther down the street, after the driver has delivered several bottles at neighboring homes. When the driver gets back into the wagon, he gets ready the bottles necessary for the next stop, makes records, etc., while the wagon is moving to the next place. With a machine, the driver must keep his hands on the steering wheel until the car comes to a full stop. Another Columbus dealer is just now trying out the small electric truck for retail delivery. These trucks are proving quite successful.

A stop-watch study made on a number of Columbus routes in 1917 showed an average running time of thirty-eight seconds and an average stopping time of fifty-one seconds for each wagon. In other words, but 42.7 per cent of the time was running time and 57.3 per cent was stopping time. Any saving made by the truck would have to come out of the 42.7 per cent of running time and out of time going to and from the plant.

In Columbus and in many other cities much time is spent in delivering milk at the back door, although the wagon passes along the street in front of the houses. A study made in one of the better residential sections of Columbus indicates that nearly one-fourth of a driver's

total time might be saved by having all bottles delivered on front steps instead of at the back door.

In some sections of the country milk is usually delivered in the daytime, and in other sections it is delivered almost entirely at night. According to the Department of Agriculture, in 1918 daylight delivery of milk was practiced in most of the Pacific coast cities, whereas night delivery was more usual in the eastern cities.[1] In some of the eastern cities the practice prevails of delivering at night in the summer months and in the daytime or early morning during the winter months. The principal reasons given for night delivery are:

"1. Custom. People have been accustomed to having their milk delivered to them before breakfast, and in some cases the same morning's milk is delivered.

"2. Less delay due to traffic at night. Many dairies prefer the night-delivery system because it is much easier to make the delivery on account of fewer automobiles and other vehicles on the streets.

"3. Deliveries are made during the cooler hours. In summer this is not only an advantage to the horse and driver, but also less attention is needed to keep milk cool than during the heat of the day." [2]

In many cities daylight delivery seems to be winning its way, at least in all but the hottest weather. The following advantages have been given for daylight delivery:[3]

"(1) Larger sales of milk;

"(2) Better collections of cash;

"(3) Better collections of empty bottles;

[1] U. S. Dept. of Agr., *Milk Plant Letter No. 53*, July, 1918.

[2] *Ibid.*

[3] *Report of the Mayor's Committee on Milk*, City of New York, Dec., 1917, p. 82.

"(4) Less theft;
"(5) Better working conditions for horses and drivers;
"(6) Facilitates municipal supervision."

The size of the load varies widely. It is to some extent limited by what a man can deliver and to some extent by other factors, such as length of route, whether customers are scattered or grouped; whether each takes a large or a small quantity; the amount of collecting done by the driver; and the amount of double tracking which he finds necessary.

Frequently the size of load is surprisingly small. In New York, for example, the Mayor's Committee estimated the average load of retail wagons at 142 quarts, whereas a theoretical maximum was said to be 428 quarts.[1] The Department of Agriculture in 1915 reported the average loads for five cities as follows:

TABLE XVI

Average Loads for Five Cities, 1915

City	*Total no. of wagons included*	*Average load in quarts*
District of Columbia	173	305
Boston	305	296
Pittsburg	125	294
Baltimore	182	277
Philadelphia	571	277

Another factor which often keeps down the size of load is the fact that every progressive dealer is planning on an increase in business. When the size of load reaches its maximum, he is likely to re-route in such a way as to give each driver further room for expansion, thus building up the business.

[1] Report of Committee on Milk, City of New York, 1917, p. 80.

The pay of milk drivers is most frequently a combination of salary and commission. In some cases, however, a straight salary is paid, and in other instances a straight commission on sales is the basis. Frequently there are bonuses of various sorts, as, for example, for a new customer, for the return of a large percentage of empties, and even for the appearance of the delivery outfit.[1]

An expensive phase of milk delivery is the collection of small accounts from many consumers. The difficulty of collection is aggravated by the fact that the amounts are for the most part too small to take to court in case the debtor will not settle. The particular methods in use are to some extent matters of custom and to some extent of preference. In some of the larger cities the collection is done largely by special collectors, the drivers doing nothing but delivering. Where this practice is followed, monthly statements are mailed to the customers, and the collectors visit only those who are delinquent in their payment. The opposite is the practice in some instances, where the whole burden of collection is placed upon the driver, he being held responsible for the value of any milk sold and not paid for. Here the drivers may make collections at every opportunity or they may make a return trip once or twice a month for the purpose of collecting.

A method which has come into quite general use in some cities is that of the use of tickets which are sold for cash. This system seems to be excellent in the case of daylight delivery but has some disadvantages in the case of night delivery. For example, in the latter case there is often trouble with theft, especially in the poorer sections. Then the ticket system usually requires that the consumer place a bottle and a ticket at a customary place

[1] *Milk Plant Letter 42*, August, 1917.

each night. An oversight then means that no milk is delivered, whereas in the daytime the driver would have rung the bell if no ticket had been put out. Moreover, with night delivery the ticket system requires occasional return trips for the purpose of selling tickets. In the better sections, of course, a check is frequently left in the bottle to pay for tickets.

In comparing ticket and other systems, several factors are involved, the principal ones being losses from bad debts, time of driver and his equipment used in making collections or sales, interest on outstanding accounts or on money paid in advance, and cost of tickets and of clerical help required by the respective systems. All of the above items, however, are difficult of accurate comparison. The loss on bad debts is entirely eliminated where tickets are sold for cash in advance. Under other methods such losses sometimes run as high as 2 per cent or more of sales. Time lost in making collections may be an important item. With night delivery, necessitating as it does one or perhaps several trips to the same house for collections, valuable time of man and outfit may be wasted in collecting one or two dollars. The writer has found numerous instances where from 10 to 25 per cent of a driver's time was spent in making collections from the retail trade. Once customers are used to the cash ticket system, practically all the waste of time may be eliminated. In the summer of 1918 the writer made the estimate that in Columbus at that time the system of selling on account cost from .23 cent per quart to .8 cent per quart more than the cash ticket system.

That a large amount of duplication exists in the delivery of milk has been shown by practically every study that has been made. The following table showing the

situation in several Wisconsin cities in the summer of 1916 is more or less typical of conditions elsewhere.

TABLE XVII

Extent of Duplication in Delivery Service in Five Wisconsin Cities, 1916 [1]

City	*Total no. of miles of city street*	*Total no. of miles traveled daily within city in delivering milk*	*No. of times each mile of street is covered*
Milwaukee	602.63	3,440.28	5.71
Oshkosh	103.30	377	3.75
Beloit	80	213.54	2.67
Eau Claire	59	142.5	2.42
Madison	81	244	3.01

It would appear from the above table that each customer's house is on the average passed by more than five delivery wagons in Milwaukee and by two or three in each of the other cities. One of the reasons for the existence of a considerable amount of duplication is variation in quality of milk, real or supposed. Preference for the milk of a given dairyman is often so strong that a housewife will insist on receiving milk from him even though she moves to a distant part of the city. In order to hold such a customer, the dairyman may try to work up some trade in the new section. A large portion of the duplication is sometimes due to the willingness of each dairyman to meet the demands of consumers as to the particular time when milk is to be delivered. In one particular instance it was found that 20 to 50 per cent of the distance traveled by certain drivers was extra travel due to the demand on the part of some of the customers that their milk be delivered in time for breakfast.

[1] *Wis Experiment Station Bulletin* 285, p. 30.

As the number of milk dealers has decreased, the amount of duplication has decreased, as is indicated by the following table:

TABLE XVIII

Saving Resulting from Consolidation of Milk Companies in Four Cities

City	*No. of firms combining*	*Total no. of routes before combining*	*No. of routes eliminated by combining*	*Per cent of routes eliminated*
Chicago, Ill.	2	60	18	30.0
Springfield, O.	2	36	6	17.3
Cleveland, O.	2	53	23	43.2
Toledo, O.	2	65	7	10.8
Total	8	214	54	
Weighted average per cent eliminated				25.2

A survey in Rochester, New York, indicates a possible reduction of delivery labor expense in Rochester, if all the delivering were done by a unified system, of approximately 37 per cent of the present cost.[1]

A unique suggestion has recently been made for the reduction of delivery expense. A writer in *The Country Gentleman*, January 3, 1920, describes his method of delivering fresh milk right to consumers in eight and a half quart cans at one dollar per can or twelve cents a quart. The consumer is furnished with quart bottles into which he empties the milk which has been delivered to him in the can, after which he places the bottles on ice. Two days later the milkman calls for his empty can and leaves a full one. This method, however, obviously has decided limits because of the unusual quantity taken by each cus-

[1] *Report of Rochester Milk Survey*, by the Committee of Public Safety of the Common Council, Dec., 1919, p. 126.

tomer and because of the infrequency of the milkman's calls.

Section 7. The Store as a Factor in Milk Distribution

Milk for household use ordinarily reaches the consumer through one of three channels:

1. It may go directly from producer to consumer.
2. It may go from producer to a dealer and then directly to the home.
3. Or it may reach the consumer through a retail store, in which case it may or may not pass through the hands of a milk dealer, since some stores are supplied directly by producers.

As has been stated, the first channel is the usual one in the smaller towns and cities. In the larger places, however, since it becomes practically impossible for any large proportion of the producers to reach the consumers directly, the second and third channels must be utilized. In Ohio cities a considerable portion of the milk is handled by stores, the exact proportion varying from about 5 per cent to over 50 per cent of fluid milk consumed in the homes.

The store as a factor in milk marketing has attracted attention, along with other marketing agencies, largely as a result of the ever-rising cost of living. The claim has frequently been made that the solution of the milk problem lies in the distribution of all milk through grocery and other stores, since these already distribute other foods. On the other hand, it has as frequently been proposed to eliminate sales by stores, or at least delivery by stores, and to have all milk delivered by producers or by milk dealers.

It is obvious, however, that any careful analysis of the

problem must take into account more than merely the economy of getting milk to the consumer under the different systems. If it were merely a matter of relative cheapness, one system or the other would very likely have driven its rival from the field before now. As a matter of fact, it is just as necessary to consider the nature and importance of the various types of services rendered as it is to study relative economy. In order to get a clear notion as to the part which the store plays in the distribution of milk, let us consider the particular services which it renders. These services may be divided into two classes: (1) that of supplying any emergency needs for milk; and (2) that of providing refrigeration for milk until it is needed for immediate consumption.

Emergency needs arise frequently in every home. Milk on hand may turn sour, or extra needs may arise after the milkman has passed. The grocer's refrigerator often serves as a neighborhood ice box. People who cannot afford ice frequently buy milk as well as other perishables just before meals. People doing light housekeeping follow the same practice. Both of these services, *i. e.*, meeting emergency needs and supplying refrigeration, can undoubtedly be performed more satisfactorily and more economically by the store, since their performance by the milk dealer would require special deliveries.

The store as a part of our milk distributing system is also desirable from the producer's point of view, since it makes possible the sale of more milk than could be sold without it. The availability of fresh milk at every neighborhood grocery naturally makes for increased sales, and also gives to the whole-milk producer within the city milk-producing zone a better opportunity to compete with the outlying producer of milk for condensery purposes, since

the latter's product is already everywhere sold by grocers.

Thus it would appear that the store has definite and necessary functions to perform and that it cannot with advantage be entirely eliminated as a vendor of whole milk.

Let us then take up the other side of the problem and ask whether or not the store can take over the entire service of retail milk distribution. There are several reasons why this cannot advantageously be done.

In the first place, milk requires daily distribution. Nature does not recognize Sundays nor holidays; stores do. Cows give milk on Sundays as well as on week days. The processes of deterioration operate every day of the year. These two factors make it impractical for consumers as a whole to lay in on Saturday a supply of milk sufficient to last over Sunday. Were the stores to make deliveries on Sundays and on holidays, their entire delivery system would have to work for a time on those days as on any other days. There are in Columbus approximately eight hundred stores of one sort or another which sell milk. It would obviously be expensive and unsatisfactory for this large group to perform a service which is now rendered by about forty producers and milk dealers. Again, stores do not make daily deliveries to all their customers. Many make no deliveries at all, and none deliver to every customer every day. The present tendency, moreover, is to cut down deliveries still further. For stores to deliver milk daily to all their customers and to any others who might wish to buy milk from them would mean many additional stops for the delivery of milk alone, which would result in increased delivery costs for stores and vastly more duplication than now exists.

In the second place, milk demands delivery at a fairly regular hour in the day, because of its perishability and because of the fact that most people use milk more at certain meals than at others, for example, at breakfast with cereals. Milk is probably more regularly used in this country than any other equally perishable food. Stores do not ordinarily make deliveries with sufficient regularity.

The cash-and-carry system does not solve the problem, since many persons are not in a position to go to a store for their milk and have no one whom they could send. The very fact that milk is so regularly needed would make the cash-and-carry plan irksome to most persons.[1]

Just as above we reached the conclusion that the store cannot be eliminated from the milk distribution service, since it performs definite and necessary functions, so we must further conclude that it cannot with advantage take over the entire retail distribution of whole milk.

Since the store can neither be wholly eliminated from the milk distribution service nor yet take over the entire service, what shall be our attitude towards it? A careful

[1] "Where the consumer relies on the grocery store, there is a tendency toward irregularity of milk consumption which is not good for the producer, the dealer, or the consumer. I sent a special investigator to every city in the United States that was trying 'the cash-and-carry plan' and I found invariably that among those consumers who relied on the grocery stores for their milk there was a marked irregularity of consumption with an average consumption below that prevailing in those districts where milk was regularly delivered. This increased consumption from the delivery of milk to the consumer direct is another reason why milk should be delivered regularly from the retail wagon rather than irregularly through grocery stores. The mother is sick, the children are late for school,—at the very time when milk is most needed it will not be at hand. . . . Of course, there must always be some grocery store trade, but this will be an accommodation which will be paid by consumers using it but not by all of the consumers in any district for those who do use it." Grand Jury Report of Franklin County, Ohio, March, 1920, quoting Dr. Clyde L. King, who had made a study of the Columbus evidence.

consideration of all available facts clearly leads to the conclusion that the store should be recognized as the proper agent for the performance of two phases of the milk distribution service, that of supplying emergency needs and that of providing cold storage for milk where consumers do not have such facilities. Any proper policy of price regulation should contemplate the continued performance of these services by allowing therefor an adequate return.

Persons who have claimed that the store is the more economical channel for milk have quite often compared unequal services. They have, for example, compared the cost of handling and delivery by a store with the cost of delivery by a milk dealer, ignoring the fact that in the former case a part of the service has already been performed by the milk dealer who delivered the milk to the store.[1] In other cases the cost of retail delivery by a milk dealer has been compared with over-the-counter sales by the store. If a comparison is made, it should be between (1) the cost of delivery to the store plus the cost of handling and delivery by the store and (2) the cost to the milk dealer of delivering directly to a home.

The margins now received by stores vary widely in various cities, ranging from nothing to three cents or more per quart bottle. The table on page 100 shows store margins for fifty-five cities in 1918.[2]

In most cities stores retail milk at the same prices as milk dealers charge their family trade. This is true whether the consumer goes after his milk or has it delivered at his home with his groceries. Dr. Clyde L. King, of

[1] See *Retailing Milk Through Grocery Stores*, U. S. Bureau of Markets, Milk Letter, October, 1919.

[2] Fifty-one of these cities are in Ohio.

Margin allowed	*Number of places*
Two cents per bottle	3
Two cents per quart, one cent per pint	21
One and one-half cents per quart, one cent per pint	3
One cent per bottle	12
One cent per quart, one-half cent per pint	7
Irregular but less than 2 cents per quart	9

the University of Pennsylvania, has proposed that milk dealers charge grocers nearly or quite the same price as is charged their family trade, making the stores take their profit out of an additional charge. The following quotation illustrates his method of approach in his capacity as milk price arbitrator for Pennsylvania and Maryland:

"I was called not long ago to a city in Pennsylvania where the price to the consumer was fourteen cents a quart and the price to the grocery stores was twelve cents a quart, the grocer retailing to the consumer at fourteen cents a quart. About forty per cent of the total milk consumed in the city went through the grocery store. The dealers were demanding that milk should go up to sixteen cents a quart because they were losing money. I found through an accountant that they were not making money and that they were losing heavily on the grocery trade. I suggested that instead of advancing the price of milk they lower it to thirteen cents and charge the same price to the grocery store, assuring them they would then make more money and deliver to the consumer more milk because the consumer would be more satisfied. The one milk dealer in the group who had accurate records immediately agreed to this and the plan was adopted. I have gone back there repeatedly and find that the policy has actually saved the dealers substantial sums of money.

"A similar policy in other cities has brought similar results. The cost of milk distribution is reduced by the

sale to retail dealers at the same price as the consumer pays, allowing the retailer to charge two cents above that price, because it concentrates business in the hands of those specially equipped to handle it. Milk should be kept and delivered under controlled refrigeration." [1]

Milk sales differ essentially from sales of most other commodities in several important respects, and for that reason should not necessarily be placed in the same class with other goods in figuring the per cent of gross profits necessary. These differences are: (1) Milk has a daily turnover, whereas few other commodities, except certain fresh vegetables, have even a weekly or monthly turnover. Milk is seldom kept for over twenty-four hours before all is sold or the balance taken back or replaced with fresh milk by the dealer. (2) There is practically no loss on milk, since the dealers generally make good any losses from soured or spoiled milk. These differences are so fundamental that there would seem to be no justification for the claim that milk, at a gross gain of ten per cent of sales, is a no-profit line, nor for the contention that the same percentage margin is required as is necessary for many other commodities with a less rapid turnover.

In New York City the store problem has of recent years taken a new turn. In that congested center demand has arisen for a cheaper milk. Large quantities of milk are now retailed through stores in bulk, the consumer going after his supply with his own vessel. This "loose" milk, as it is called, is sold at several cents per quart less than milk bottled and delivered. In January, 1920, the "loose" milk retailed at thirteen cents a quart, whereas the bottled milk of similar grade was delivered at the homes at eighteen cents. According to King's theory, this large

[1] Grand Jury Report of Franklin County, Ohio, March, 1920.

consumption of milk sold through stores has probably been somewhat responsible for increasing the cost of distributing that portion which is delivered to the homes, since the deliverymen of all the existing companies continue to travel approximately the same routes, which, however, are now somewhat more scattered.

Section 8. The Surplus Problem

One of the big problems in connection with the maintenance of a city milk supply is that of the surplus. Both supply and demand fluctuate irregularly. Demand falls in cool weather, whereas supply is usually increased by a cool, wet spring.[1] Figure 7 shows the fluctuations for a

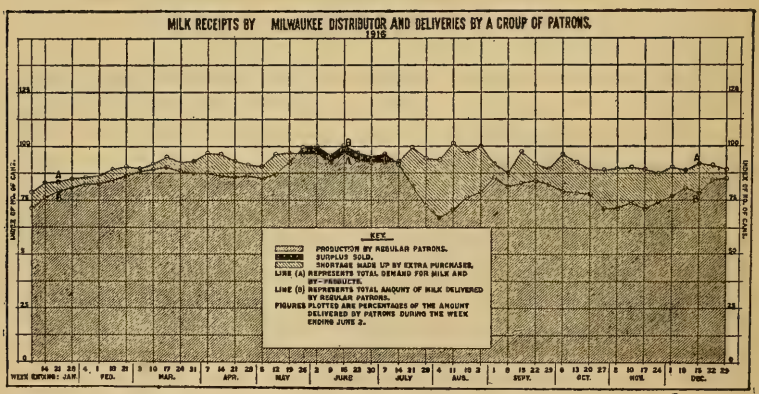
MILK RECEIPTS BY MILWAUKEE DISTRIBUTOR AND DELIVERIES BY A GROUP OF PATRONS.
1916
KEY
PRODUCTION BY REGULAR PATRONS.
SURPLUS SOLD.
SHORTAGE MADE UP BY EXTRA PURCHASES.
LINE (A) REPRESENTS TOTAL DEMAND FOR MILK AND BY-PRODUCTS.
LINE (B) REPRESENTS TOTAL AMOUNT OF MILK DELIVERED BY REGULAR PATRONS.
FIGURES PLOTTED ARE PERCENTAGES OF THE AMOUNT DELIVERED BY PATRONS DURING THE WEEK ENDING JUNE 2.
WEEK ENDING: JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

FIG. 7.—Fluctuations in Supply and Demand of a Milwaukee Dealer. From Wis. Agr. Exp. Sta. Bul. 285.

Milwaukee dealer and his patrons. It will be noticed that during a portion of the year a considerable shortage

[1] In the summer of 1917 New England had a tremendous surplus, due largely to a cool, wet spring, which made good pastures, much milk, and at the same time decreased consumption. *New England Dairyman*, September, 1917, p. 8.

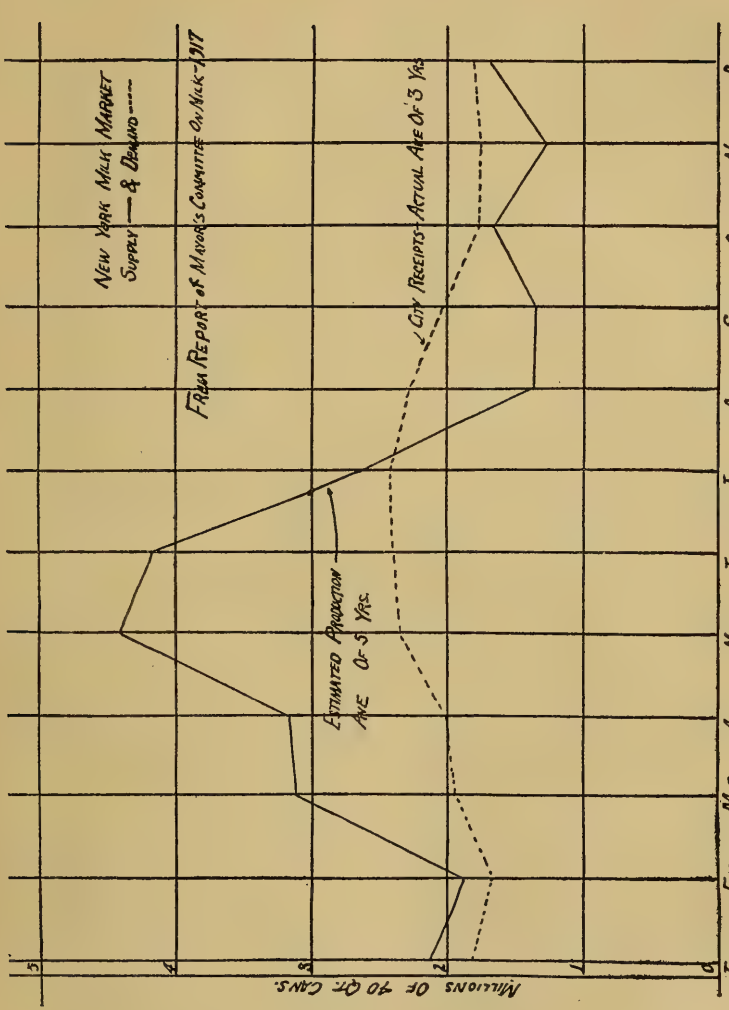

FIG. 8.—Supply and Demand in the New York Market. From Report of Mayor's Committee on Milk, 1917.

was made up by extra purchases from creameries or other sources. In this particular instance the surplus over fluid milk demand was not very great. The charts for Boston, Philadelphia, and several of the other cities are more typical in that they show a much larger proportion of surplus above fluid milk needs. The demand in all these instances fluctuates much less throughout the year than does the supply. Health ordinances may have more or less influence over the shape of the surplus chart; for example, where health regulations are stringent a dealer must provide for more milk to meet needs at shortage periods than would be the case if he could readily get additional milk from some cheese factory or condensery. For this reason Columbus must carry a greater surplus than would be necessary if it could readily tap at shortage periods the milk supply available around Springfield, Ohio, which is coming to be a condensery center.

Producers have loudly protested that there is no such thing as a "surplus," asserting that the dealers were simply using the fact of the existence of a slight excess as a means of beating down prices. During the past few years, however, statistics have been collected by numerous milk commissions and food administrators which have confirmed the dealers' claims and convinced the producers.[1]

It is true that there is no surplus for consumers as a whole nor for certain large dealers who also manufacture large quantities of the various by-products regularly. Of course in any case there is always a demand for all of the milk for some purpose, but some demands will take the milk only at the lower prices. In most cities the majority of the milk dealers do mainly a fluid milk business, and many of these plants are not equipped for the manu-

[1] *New England Homestead*, August 3, 1918, p. 76.

facturing of by-products. For these there is a very real surplus.

The products into which surplus milk is ordinarily manufactured, such as condensed milk, cheese, butter, etc., are practically non-perishable and of high specific value, and can therefore be readily preserved and transported for long distances cheaply. The result is that they

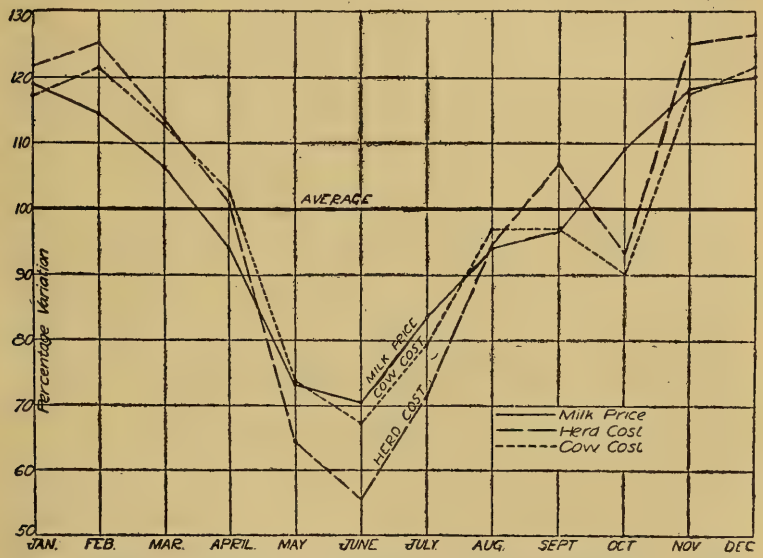

FIG. 9.—Monthly Variation in Price of Milk and in Cost of Production. From Ill. Agr. Exp. Sta. Bul. 224.

can be produced largely during seasons when cost of production is lowest and that they can be produced far from market on cheap land. Condensed milk and cheese come largely from outside the milk belts of large cities or from other sections favorable to dairying, such as are found in Wisconsin, on the Pacific coast, and elsewhere. Butter is produced very generally as an adjunct to general farm-

ing. All of these products are usually produced while the cows are on grass. Cheese was formerly produced almost entirely in the summer months. In the Sheboygan, Wisconsin, cheese district most of the factories used to close for the winter months. In December, 1919, only 22.5 per cent as much American cheese was produced in the United States as was produced in June of the same year. In December, 1918, 22.6 per cent as much was produced as was produced in June, 1918. In February, 1919, butter production was only 37 per cent of the production for June. The unsweetened, evaporated milk production of November, 1919, was 51.4 per cent of the June production.[1]

Fresh milk for city use, on the other hand, must be produced within a relatively short distance of the city within which it is to be marketed. It is often produced on land which has a high value for other purposes, and where homegrown feeds are high-priced, owing to the strong city demand for them. Hence a supply of fresh milk is forthcoming with sufficient regularity only when prices are high enough to maintain that supply during seasons of highest cost and lowest production, which usually means a somewhat higher price than that paid for milk entering milk products. When, however, more is produced than is required for direct consumption, the balance must be utilized for some other purpose,—and we have a "surplus." [2]

That the surplus problem really arises out of the lower cost of production in summer than in winter should be fairly clear when we consider that for years a sufficient quantity of milk has been forthcoming in the winter months

[1] *The Market Reporter*, April 3, 1920.

[2] See *Hoard's Dairyman*, June 13 and July 25, 1919.

and a great surplus produced in the summer months, even though summer milk has invariably had to face a lower price,—this in spite of the fact that it is possible to produce a fairly uniform supply. Farmers have long been urged to do away with the surplus by producing an even supply throughout the year. Some few farmers do try to act on this advice, but most of them find that they can better afford to produce an uneven supply and take the lower price in summer. To urge such a change is futile if costs are such as to make it more profitable to produce in the summer months. Figure 9 taken from the *Illinois Experiment Station Bulletin* 224, page 17, shows the average monthly variation in price of milk and in cost of production for a series of years. If this chart is correct, no amount of advice will induce farmers to do away with the summer surplus problem. Another remedy that is very frequently proposed is that advertising be used so to stimulate demand as to absorb surplus. Thus far the experience has been that the demand for fluid milk is not sufficiently elastic to respond to advertising in any measure corresponding to the surplus.

Among the numerous plans for meeting this problem which have recently been suggested, probably none has received more attention during the past two years than that of the coöportative manufacture of the surplus into the various by-products by the farmers themselves. The Dairymen's League of New York and surrounding states, the Milk Producers' Coöperative Marketing Company of Chicago, the Twin City Milk Producers' Association, several of the Pacific Coast associations, and numerous others have already taken steps along this line. The Twin City Milk Producers' Association was in September, 1919, operating ten cheese factories for the purpose of utilizing

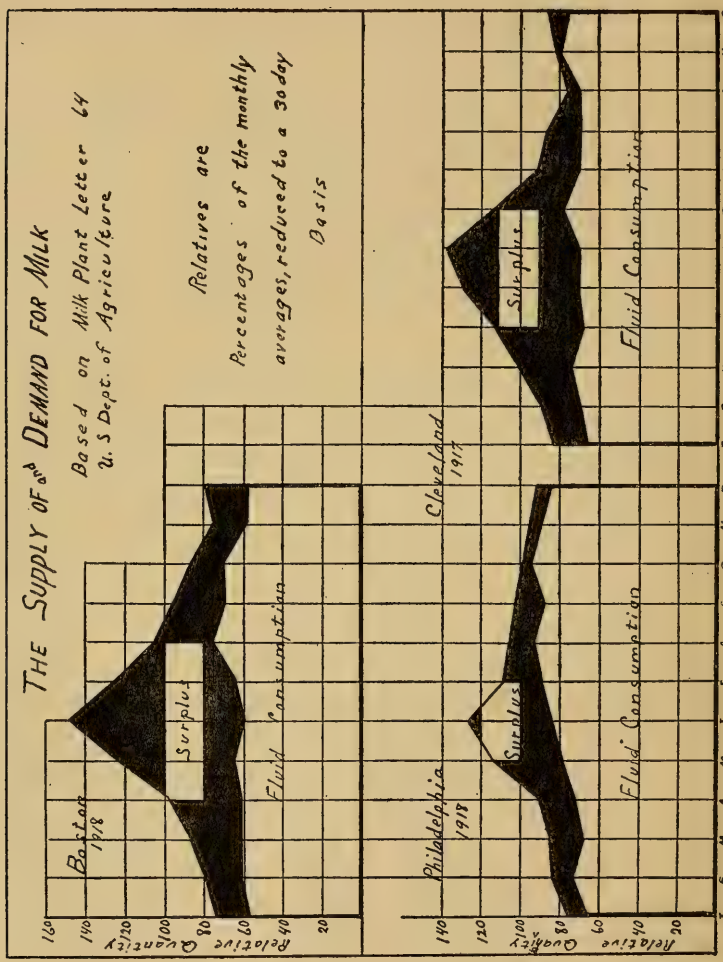

FIG. 10.—The Supply of and Demand for Milk in Boston, Philadelphia, and Cleveland.

any surplus.[1] It may be questioned, however, whether the farmers will in the end receive a higher net price in all cases. These coöperative plants will have to handle the milk in much the same way as the men to whom the farmers formerly sold the surplus and will have to enter the trade channels in competition with them. Unless the farmers get operators who are skillful and business-like and elect directors who are sufficiently far-seeing and who have a sufficiently clear conception of the price-making forces, some of these plants are certain to meet with financial reverses. B. H. Rawl, in a recent article, gives the following requisites for the successful operation of a plant such as is contemplated by a large number of these producers. "First, efficient management; second, large volume of milk of high quality; third, adequate equipment and capital; and fourth, markets."

"All of these conditions," he continues, "are not necessary to enable the creamery to produce certain by-products, but they are necessary for the plant that utilizes all the constituents of milk to the best advantage." [2]

Philadelphia has, since January, 1920, been handling its surplus problem by paying a basic price, determined by conference, for the following percentages of the average monthly production for the months of October, November, and December, 1919:

January.....100	April....100	July.....110
February....100	May....110	August.....105
March.....100	June....110	September..100

"For milk produced in excess of the stated percentage amounts the price to be received would be determined

[1] *Milk Magazine*, Sept., 1919, p. 17.
[2] *Hoard's Dairyman*, Nov. 28, 1919, p. 880.

by taking 120 per cent of the average daily price of New York 92 score (solid pack) tub creamery butter, as published by the U. S. Bureau of Markets, for the month. The price of 100 pounds of milk would be determined by multiplying the percentage of butterfat in milk by this price. This arrangement is expected to simplify the problem of determining the price to be received by producers for surplus milk in the Philadelphia district." [1]

In January, 1920, the price of 4 per cent surplus milk in Philadelphia was $3.12 as compared with a basic price for fluid milk of $3.61.[2]

The New England milk producers have probably had more experience with surplus plans than have the producers of any other section of the United States. For many years milk had been sold in that market at a summer and winter price; for example, in 1886 and 1887 the summer price was thirty cents per eight and one-half quart can and the winter price thirty-six cents. These prices, however, applied only to milk which the dealers sold as fluid milk plus a margin of about 5 per cent. "All surplus beyond this was made into butter by the contractors at their creameries on the farmer's account, allowing each month, as the value of the butter, the average of the jobbing price of butter quoted by the chamber of commerce during the month and charging four cents per pound for making. Thus the farmer was sure of getting at least butter value for all the milk he could make." [3] The farmers, however, raised so many objections to this system that in 1889 the matter was taken up with the state board of arbitration, which decided that the surplus principle

[1] *The Market Reporter*, Jan. 17, 1920.
[2] *Milk News*, Feb., 1920, p. 10.
[3] *Report of Industrial Commission*, 1900, Vol. 6, p. 409.

was a sound one.[1] The surplus continued to be a matter of controversy until the spring of 1910, when the surplus system was discontinued as a result of a dairymen's "strike" and a graduated price substituted. This practice continued until May, 1918, when the surplus plan was again resumed. At that time the Regional Milk Commission for the New England states secured an agreement between producers and distributors which authorized the commission to inaugurate a surplus plan, which the commission did shortly afterwards. The plan was quite elaborate and provided numerous checks, among which was a set of records to be kept by the dealers which would enable the milk administrator to verify the dealers' reports and thus do away with suspicion on the part of the producers. Much objection had been raised to the earlier plans on the ground that the dealers were manipulating their records. The plan as put into operation provided that each dealer was to pay for fluid milk an established price and for that portion worked up into by-products a price established by the milk commission and later by the milk administrator. Since each dealer could choose his own channels for utilization of surplus, the result was a widely varying price for different dealers, which to some extent caused dissatisfaction among producers.[2]

A similar plan was tried in Akron, Ohio, in the summer of 1918, without, however, any public supervision. The plan was abandoned at the end of the first six months, partly because of the fact that it led to different prices paid by different dealers. For example, in April, May, and June of that year the following prices prevailed:

[1] Report of Industrial Commission, 1900, Vol. VI, p. 410.

[2] The plan is fully discussed in the *New England Dairyman*, May, 1918, pp. 2 and 3.

TABLE XIX

Operation of Akron, Ohio, Surplus Plan

Month	*Quoted price*	*Skim milk per cwt.*	*Butterfat per lb.*	*Dealer A*		*Dealer B*	
				Per cent surplus	*Actual price*	*Per cent surplus*	*Actual price*
April....	$3.35	40¢	47¢	33	$3.11	12	$3.20
May....	3.35	40¢	46¢	44	2.98	10	3.06
June....	3.35	40¢	46¢	45	2.92	16	3.14

The Mayor's Committee (New York, 1917) proposed a plan somewhat like that since put into operation in New England, except that the dealers were to pool their purchases and sales, so that the producers would all be paid the same price, no matter to which dealer they sold.

"If producers enter into agreements with each other for collective bargaining with the distributors, and distributors enter into agreements with each other for collective buying from producers, a mechanism is furnished whereby surplus milk can be easily handled in a way entirely fair and just to both parties. To illustrate this the following example may be taken:

Dealer	*Pounds of milk bought*	*Pounds of milk sold*	*Surplus milk*
1.....	10,000	8,000	2,000
2.....	20,000	12,000	8,000
3.....	50,000	45,000	5,000
Total.....	80,000	65,000	15,000
Percentage.....	100%	81.25%	18.75%

"In the above table it appears that there was 80,000 pounds of milk purchased, of which 65,000 pounds was

sold as fluid milk, amounting to 81.25 per cent; the balance, 15,000 pounds, was surplus milk, amounting to 18.75 per cent. In this way the quantity of milk purchased by all retailers of the City of New York and the quantity sold as fluid milk and the quantity of surplus could be estimated at the end of each month and the percentage of surplus milk stated. In the above example it is suggested that the producers be paid for 81.25 per cent of all the milk produced by them at the full fluid price and that they be paid for 18.75 per cent of the milk at a price which corresponds to the full market price for butter, plus the full market price for by-products of butter, including skim milk and buttermilk. Such a plan would require that some person, or commission, in whom both producers and dealers had confidence, should furnish a statement of the total quantity of fluid milk bought and sold as fluid milk and of the total quantity of surplus milk which could not be sold as fluid milk, but must be manufactured into milk products.

"From the producers' standpoint this plan pays the producer all that he could possibly secure out of the business if he were marketing the milk himself. The producer could not expect to sell as fluid milk any more fluid milk than the market will absorb. Consequently, if the retailer were eliminated and the producers were retailing their own product, the surplus milk unsold as fluid milk and thrown back on their hands would be the same surplus which would be in the hands of the distributors under the plan above mentioned. The price producers would receive for this surplus would be the same price they would receive from the dealer in the above mentioned plan.

"It is a fact that the distributor is in a much more ad-

vantageous position than the producer for the handling of surplus milk, both in the processes of manufacture and in the matter of marketing. The producer could not expect to manufacture surplus milk or market the same in any different way or any more cheaply than these processes can be performed by the large distributor.

"The particular value to the producer of pooling his interests and arriving at a percentage of fluid milk and a percentage of surplus milk which is uniform for all producers is that payment would be entirely uniform for all producers. The irregularities of milk production in different districts and the differences in the marketing facilities of different dealers have for many years been imposing great hardships or given advantages to producers and distributors which are unfair to the industry as a whole. If uniformity of market price is so desirable that producers recognize the importance of united action, then it is a logical corollary that there should be uniformity in the percentage and in the price of surplus milk and that all farmers and distributors should be treated alike in this matter.

"The payment for fluid milk and surplus milk, according to the percentage of the entire supply sold as fluid milk and manufactured as surplus milk, would, however, entail a severe hardship on the distributor if his percentage of fluid milk sold and surplus milk manufactured did not correspond to the percentages of the entire supply. For example, in the tabulation above given we can assume that each of the three dealers is compelled to pay for 81.25 per cent of his fluid milk at full price and for 18.75 per cent of his milk at butter prices. Under these conditions the following tabulation indicates the result:

Dealer	*Total purchases*	*Paid at full price*	*Over-paid*	*Under-paid*
1	10,000	8,125	125	....
2	20,000	16,250	4,250	....
3	50,000	40,625	....	4,375

"In the above table it appears that if each dealer should pay to his producers at full price for fluid milk for only that portion of his supply which corresponded to the total percentage of fluid milk sold on the entire market, dealer No. 1 would have overpaid for 4,250 pounds, while dealer No. 3 would have underpaid for 4,375 pounds. In the former table it appears that dealer No. 3 actually marketed 45,000 pounds at full price, but in the lower table he paid for only 40,625 pounds at full price. On the other hand, dealers Nos. 1 and 2 paid for more than they sold at full price. In short, dealers Nos. 1 and 2 would sustain losses by this transaction, while dealer No. 3 would have an unfair gain. It is obvious that the adjustments could be easily made by the dealers themselves, through some form of exchange or clearing house, whereby those dealers who have sustained undeserved losses can be recompensed by those dealers who have made unmerited profits. The undeserved losses and the unmerited profits are exactly equal to each other, consequently the exchange could bring about an adjustment between the dealers of these differences without affecting their individual business interests in the slightest degree." [1]

The cost of meeting surplus and shortage has been placed at different figures. The Alderney Dairies of Philadelphia had kept records for twenty years prior to 1913 and from these calculated that at that time it had cost

[1] *Report of the Mayors' Committee on Milk*, City of New York, 1917, pp. 68–70.

them .5 cent per quart on their entire sales to keep supply and demand adjusted.[1] In Boston, where the matter of surplus has been a bone of contention for nearly forty years, the dealers made a deduction from the farmers' milk checks for the month of May, 1918, of 1.1 cents per quart because of an over-production of 34.37 per cent for the month.[2] For the whole of 1918 the average price awarded by the New England Milk Commission was 8.58 cents per quart; the actual price paid was 8.21 cents. The difference of .37 cents was loss on surplus.[3] In one of the Ohio coöperative plants in July of 1919 the loss on surplus milk amounted to approximately .75 cent per quart on all bottled milk sales. In Rochester, New York, the loss on surplus was estimated at .4337 cent per quart in 1919.[4]

One big objection to such a plan as that proposed by the New York Committee or the plan followed in Boston is that some sort of public supervision is necessary. Even with such supervision the Boston producers question the accuracy of the reports made by the dealers.[5] Another objection is that neither plan seeks to shift the surplus burden to the particular producers whose heavy summer production caused it. This the Philadelphia plan seeks to do. The latter plan also makes it possible for the producers to know in advance what price they will get.

None of these systems, however, really solves the surplus problem. Nor is it likely to be solved until both producers and dealers approach the question in a more frank

[1] *Annual Report of International Milk Dealers' Association*, 1913, pp. 75–79.
[2] *New England Homestead*, Aug. 3, 1918, p. 76.
[3] *New England Dairyman*, Mar., 1919, p. 8.
[4] *Milk Survey of the City of Rochester* (1920), p. 154.
[5] *New England Dairyman*, Sept., 1919, p. 1.

and open way, or until producers themselves arrange to take care of the surplus, distributing the burden equally among themselves in proportion to the amount of surplus produced.

Section 9. Cost of Distribution

Cost of distribution has been stressed particularly in almost every discussion of the milk problem. During the past three or four years especially there have been numerous investigations along this line. Although the results of quite a number of these have been published, many of the published figures are not comparable because of changes in the price level between the different dates covered by the investigations, as well as because of differences in the methods of ascertaining the costs.

The discussion of costs has arisen largely out of the wide difference between what the farmer gets and what the consumer pays. Farmers have repeatedly insisted that they were entitled to a larger proportion of the consumer's dollar than they have been getting. Though the proportion has usually fluctuated about the fifty-fifty mark, the farmer has frequently received less and at times more. The president of one of the largest milk producers' associations recently said that the cost of milk distribution should not exceed 35 per cent of the consumer's dollar, which would leave the farmer 65 per cent to cover cost of production, cost of transportation, and profit. The justice of any specific percentage, whether it be 35 or 50 per cent or any other figure, cannot be established once for all, but will have to be ascertained for each particular case. With many manufactured products the proportion of the consumer's dollar going to the original producer is even smaller than in the case of milk. There is no reason,

however, why farmers should not inquire why the margin is as wide as it is in the case of their commodity, nor why they should not attempt to narrow it. They are interested in selling as much of their product as they can produce. They believe that a narrower margin would mean lower retail prices and a consequent increased demand, as well as higher farm prices, so that a reduced cost of distribution would directly benefit both them and the consumer.

Furthermore, they are justified in proposing to take up certain phases or all of the distribution, if they think that by doing so they can reduce the margin between themselves and the consumer.

In much of the discussion the terms "cost" and "spread" are confused. By cost of distribution is meant the expense incurred in moving the product from farm to consumer. It is usually thought of as the difference between what the producer gets and what the consumer pays less the dealer's profit. The latter is commonly believed to be a big item. The term "spread" has recently come into use to designate the difference between the dealer's selling price for a given unit and the price paid the farmer. This difference cannot be considered synonymous with the term "cost of distribution." For example, a milk dealer sells a part of his milk in quart bottles to retail trade, a part to retail trade in pint bottles, a part to the wholesale trade in quarts and pints, and some to the wholesale trade in bulk, each going at a different price. Obviously the spread or difference between his retail price and the quart price paid to the farmer does not measure his profit nor his true margin. The true margin can only be ascertained by properly weighting the amounts sold in the different ways. Table XX illustrates this point.

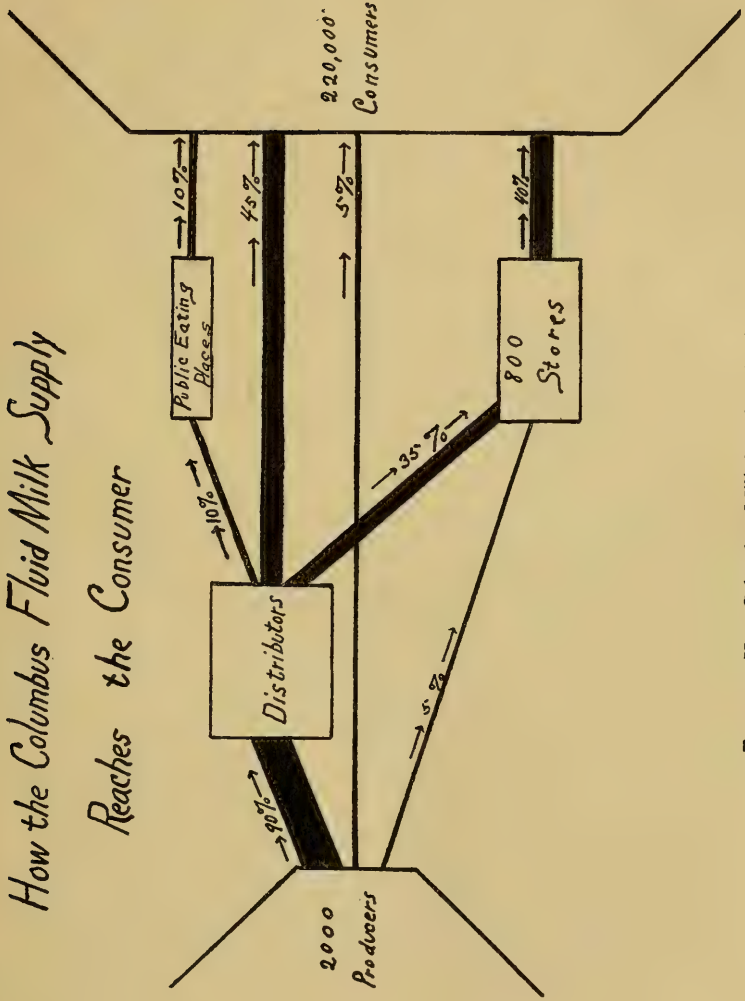

FIG. 11.—How Columbus Milk Reaches the Consumer.

TABLE XX

A Columbus, Ohio, Dealer's Margins

Price per qt., cents	*How sold*	*Per cent of milk sales in each class*	*Amount contributed to the price of an average qt. by each class*
13	By quart retail delivered	18.5	$.02405
14	By pint retail delivered	15.5	.02170
11	By quart wholesale	36.0	.03960
12	By pint wholesale	30.0	.03600
		100	
	Weighted average price received		$.12135
	Cost per quart		.075
	True spread or margin		$.04635
	Commonly spoken of as spread ($.13-$.075)		.055

The spreads of different dealers vary widely. Although they may be indicative of differences in costs, they are by no means conclusive. One of the instances of differences upon which there has been a great deal of comment is that between the spreads of Philadelphia and of New York. Philadelphia has the lower margin and also the lower retail price. In 1913 the average price in Philadelphia was 8 cents, in New York 9 cents a quart. For 1919 the averages were 13.6 cents and 16.1 cents respectively, a difference of 2½ cents as compared with a difference of 1 cent when the price was lower. The retail price in Philadelphia had increased 70 per cent, in New York 79 per cent. The fact that these ratios have practically been maintained over a period of years in spite of the fierce competition in both places indicates that there are probably fundamental reasons for such differences.

"Unquestionably the net profits realized by the leading milk marketing concerns, on the basis of both capital in-

vested and volume of sales, were larger in the case of some cities than of others; but audits of the accounts of some of the representative milk marketing organizations in different cities show that there is not even a general correlation between net profits and the margins of gross profit on retail sales. Even if per unit costs of plant operation and delivery service were approximately the same, the net profits of any particular business enterprise would be dependent to a large extent upon the proportionate volume of sales at the prevailing market prices to different classes of wholesale and retail trade." [1]

The following table from the Bureau of Markets gives dealers' spreads or margins in twelve of the largest cities of the United States for the nine months' period ending March, 1919.[2]

TABLE XXI

Dealers' Margins (Spread Between Price Paid and Selling Price) on Quart Sales of Standard Grade Milk Delivered to Different Classes of Trade

City	*Bulk milk to hotels, cents*	*Bottled milk to hotels, cents*	*Bottled milk to families, cents*
New York	2.95	5.95	6.87
Chicago	2.89	4.85	5.64
Philadelphia	2.65	3.95	4.76
Boston	3.96	4.65	6.63
Baltimore	4.90	6.15	6.76
Pittsburg	3.46	5.36	5.63
Cleveland	2.37	3.97	6.19
Detroit	3.28	5.77	7.02
Milwaukee	1.74	3.62	4.24
Minneapolis	2.47	3.52	4.84
New Orleans	1.67	4.42	6.42
San Francisco	2.18	4.57	6.05
Averages of above cities	2.876	4.731	5.92

[1] *Hoard's Dairyman*, Jan. 16, 1920, quoting U. S. Bureau of Markets. [2] *Ibid.*

As in every other industry, costs in milk distribution vary widely. Table XXII shows the variations in the cost of handling milk at city plants in Detroit in 1915. It will be noticed that the costs vary from 2.3 cents to 7.2 cents among the different dealers.[1]

The delivery costs vary nearly as widely, as is shown in Table XXIII.[2]

Costs, of course, will also vary from time to time with changes in prices, in wages, and in methods. Table XXIV gives the results of a number of investigations as to the cost of distribution in various cities. Some of these are for retail only, and others are for a mixed business. Nos. 9 to 12, inclusive, show the cost of distributing a quart of milk through four different channels used by the Borden Company in New York City, No. 9 being on routes of their family trade, No. 10 the company's sales to retail stores, No. 11 retail sales at the company's own stores, and No. 12 wholesale bulk sales. It should be pointed out that although the company made a profit on only those sales made at its own stores (No. 11), this is no evidence that the store method is the more economical. These sales were made at the same prices as were charged on the company's retail routes, although the consumer went after his milk. Nos. 22, 23, and 24 make a somewhat similar comparison for the city of Rochester, New York, as was made for New York City. It will be noticed that in the column headed "Profit or loss" the items are frequently loss. This of course is due to the fact that many of these investigations were made at times when the dealers were trying to raise prices or had raised prices on the grounds of increased costs of material or cost of milk.

[1] *U. S. Department of Agri. Bulletin* 639, p. 18.

[2] *Ibid.*, p. 21.

TABLE XXII

Relation of Cost of Handling to Capital Investments, Supplies, and Labor in Twenty-Eight City Milk Plants

Handling cost per gallon [1]	*Gallons handled daily*	*Investments*		*Supplies* [2]		*Labor*	
		Total	*Per gallon handled daily*	*Per day*	*Per gallon*	*Per day*	*Per gallon*
Cents					*Cents*		*Cents*
2.3	1,600	$13,300	$8.31	14.96	0.9	$13.68	0.9
2.4	350	4,320	12.34	11.84	1.2	1.99	.6
2.6	9,706	267,575	27.57	70.01	.7	167.82	1.7
2.6	2,000	16,824	8.41	16.57	.8	27.21	1.4
2.7	850	7,154	9.54	5.48	.7	10.68	1.4
2.8	1,450	41,643	28.72	9.76	.7	14.25	1.0
3.1	1,450	18,720	12.90	18.42	1.3	17.03	1.2
3.3	220	1,917	8.71	2.45	1.1	3.81	1.7
3.3	340	3,502	10.30	3.24	1.0	5.98	1.8
3.4	470	2,527	5.38	4.87	1.0	9.86	2.1
3.6	400	5,312	13.28	4.20	1.0	7.40	1.9
3.7	165	3,029	18.36	1.95	1.2	2.71	1.6
3.8	2,119	97,457	45.99	11.79	.6	47.31	2.2
3.9	425	7,595	17.87	5.61	1.3	7.12	1.7
4.4	335	4,542	13.56	5.43	1.6	5.98	1.8
4.4	100	1,186	11.87	1.64	1.6	2.00	2.0
4.5	310	3,847	12.41	5.18	1.7	5.84	1.9
5.2	230	4,927	21.42	2.35	1.0	7.13	3.1
5.2	1,300	7,315	5.63	36.10	2.8	9.97	.8
5.3	100	1,829	18.29	1.18	1.2	2.99	3.0
5.4	240	7,141	29.75	3.70	1.5	6.04	2.5
5.4	530	20,251	38.21	6.76	1.3	10.54	1.0
6.1	135	1,829	13.55	1.57	1.2	5.60	4.1
6.8	85	2,705	31.82	1.24	1.5	3.00	3.5
6.8	1,260	110,592	87.77	33.78	2.7	21.80	1.7
7.0	145	4,274	29.48	3.58	2.5	4.70	3.2
7.1	90	2,762	30.69	2.18	2.4	2.56	2.8
7.2	40	1,725	43.13	.51	1.3	1.50	3.8
Ave. 4.4	940.9	23,778	21.97	10.23	1.4	15.23	2.01

[1] These unit costs include charges for depreciation and interest on capital invested, supplies, and labor expenses (all the items which could be definitely charged against handling in plant).

[2] Supplies include charges for fuel, ice, power and light, bottles, caps, washing powder, brushes, etc.

TABLE XXIII

Relation of Costs per Quart Delivered to Investments in Delivery Equipment, Average Number of Quarts Delivered per Wagon, and Per Cent of Sales at Retail for 28 Dealers

Cost per quart [1]	*Investments in delivery equipment*		*Number of delivery wagons*	*Average quarts delivered per wagon daily*	*Per cent of sales at retail*
	Total	*Per gallon delivered daily*			
Cents					
0.5	$1,005.00	$3.24	1	1,240	0.0
.8	956.00	4.35	3	293	77.3
.9	1,527.00	9.25	1	660	50.0
1.1	14,899.10	8.92	14	477	54.5
1.2	527.50	4.06	2	260	73.1
1.2	7,280.00	6.31	12	384	62.5
1.2	2,480.00	6.12	4	405	47.1
1.2	8,779.00	6.05	14	414	93.3
1.2	870.00	8.70	1	400	77.2
1.3	2,907.00	12.11	3	320	60.0
1.3	1,180.00	8.74	1	540	77.3
1.3	40,050.85	18.90	14	605	58.9
1.4	170,090.04	17.52	99	392	81.3
1.4	15,055.50	9.45	16	400	53.3
1.4	692.00	8.14	1	340	62.5
1.4	2,096.00	6.45	3	433	76.9
1.4	8,779.00	6.86	14	366	34.5
1.5	3,030.00	10.10	4	300	65.0
1.5	1,160.00	4.64	5	200	50.0
1.5	1,595.50	6.94	3	307	73.8
1.5	575.00	14.38	1	160	85.0
1.6	1,570.00	17.44	2	180	61.5
1.6	2,740.00	8.06	4	340	74.5
1.6	7,375.00	17.35	4	425	65.0
1.7	785.50	7.85	2	200	64.3
1.7	2,623.33	7.83	3	447	71.4
1.8	2,831.50	5.34	6	353	80.0
2.5	29,225.35	23.19	20	252	56.9
[2] 1.38	[2] 11,881.75	[2] 9.58	[2] 9	[2] 396	[2] 63.9

[1] These unit costs do not include items of administration, office expenses, advertising, licenses, insurance, taxes, and other miscellaneous expenses. [2] Average.

There are numerous reasons for such variations in costs as are shown in these tables. One reason is that of the use of different trade channels in varying proportions, as shown in the discussion of Borden's costs above. Size of business is another factor making for differences in costs, although there is apparently not always a close correlation between size and costs. Table XXV shows a somewhat smaller cost for the two middle groups than for either the smallest or the largest in size, whereas the largest apparently has the highest costs. Table XXVI, however, indicates that the plant expense is lowest for the largest concerns, while Table XXVII would indicate that the delivery cost of the same group is somewhat higher in the case of the larger dealers. The plants of medium size again have the advantage. The figures recently published in the report on the investigation of the milk supply of Rochester, New York, indicate that the labor costs per quart vary in much the same way as do the total costs shown by the Massachusetts study as set forth in Table XXIV above, namely, that the middle group operates somewhat more cheaply than do the smaller dealers, while the highest costs of all are those of the larger dealers. Because of their large volume of business the latter are able to operate on very narrow margins of profit. Table XXIX gives the results of the Rochester survey.

In addition to variations in costs arising out of type of business, size of business, etc., there is the whole question of the relative efficiency of dealers. Properly coördinating the various items of labor and equipment in a complex business which must be adjusted to local conditions requires a high degree of business skill. Methods of assembling and distributing also make a difference, as do also local marketing conditions arising out of the degree of concentration in the business, demands of the consumer for special service, etc.

TABLE

Compilation of Costs of Distribution, Prices Paid

No.	Year	City or state	No. of dealers	Remarks	Cost of distribution		
					Transportation, cents	Processing, cents	Delivery, cents
1	1914	Philadelphia	1	.....	.52	.....	.....
2	1914	Philadelphia	1	.....	....	.....	.....
3	1914	Philadelphia	1	.....	...	.....	.....
4	1915	Detroit	28	.....	....	..946	1.193
5	1916	Wisconsin	..	All bottled	.489	1.172	1.541
6	1916	Massachusetts	80	Retail	....	.758	1.528
7	1917	Boston	Several	.....	.628	1.564	2.926
8	1917	Boston	20 small	.....	....	.928	1.211
9	1917	New York City		On routes	.844	2.242	3.761
10			1	To retail stores	.844	2.242	2.757
11			(Borden)	At company stores	.844	2.242	2.678
12				Wholesale bulk	.844	1.444	.774
13	1917	New York City	1	Empire State	....	.....	.....
14			1	Clover Leaf	....	.....	.....
15			1	Mutual McD	....	.....	.....
16			1	Alex Campbell	....	.....	.....
17			1	Borden	....	.....	.....
18	1919	New York State	26	All business	....	.....	.....
19	1919	New York State	12	Retail only	....	.....	.....
20	1919, July	Ohio	1	.....	....	.....	.....
21	1919, Nov.	Ohio	1 (same)	.....	....	.....	.....
22	1919, Aug.	Rochester, N. Y.	All	Retail bottled	.553	.....	.....
23				Wholesale bottled	.553	.....	.....
24				Wholesale can	.553	.....	.....
25			All	All milk	....	.....	.....
26	1917	Cleveland, O.	1	Retail bottled	....	.....	.....
27	1917, Oct	Detroit	Several	Retail bottled	....	.....	.....

TABLE XXV

Cost of Distribution, Eighty Plants, Massachusetts (1916) Classified According to Size of Business [1]

	No. quarts sold daily			
	Under 500 quarts	500 to 1,000	1,000 to 2,000	Over 2,000
No. of establishments	27	20	10	3
	cents	cents	cents	cents
Expense per quart:....				
Preparation.....	.65	.46	.45	.67
Delivery.....	1.14	.89	1.05	1.35
Overhead.....	.25	.29	.32	.47
Total expense.....	2.04	1.64	1.82	2.49

[1] *Massachusetts Agri. Exp. Station Bul.* 173 (1917), p. 17.

XXIV

and Charged, and Profits or Losses in the Milk Business

per quart		*Price paid producer, cents*	*Selling price, cents*	*Profit or loss, cents*	*Where reported*
Overhead, cents	*Total cost, cents*				
....	3.43	3.71	7.80	+.14	Pa. Pub. Com., File No. 357, p. 40
....	.....	.....	.....	+.20	*Ibid.*
....	.....	.....	.....	+.14	*Ibid.*
.309	2.447	.....	.....	.....	U. S. Dept. Agr. Bul. 639, p. 24
....	3.202	3.276	.....	.....	Wis. Bul. 285, p. 47
.492	2.790	.....	.....	.....	Mass. Exp. Sta. Bul. 173, p. 14
.494	5.612	4.498	10.421	+.311	*Milk Question in New England*, Boston Ch. of Commerce, p. 46
.494	2.633	.....	.....	.....	*Ibid.*, p. 55
.171	7.018	7.425	14.	— .443	*Report of Mayor's Committee on Milk*, N. Y., p. 62
.171	6.014	7.425	13.	— .439	*Ibid.*
.171	5.935	7.425	14.	+.640	*Ibid.*
.051	3.113	7.425	10.	— .538	*Ibid.*
....	3.192	5.627	8.680	— .139	*Ibid.*, p. 58
....	3.483	5.645	8.855	— .273	*Ibid.*
....	3.549	5.198	8.322	— .425	*Ibid.*
....	3.605	5.782	11.628	+.241	*Ibid.*
....	4.761	4.568	9.314	— .015	*Ibid.*
....	3.366	8.945	13.707	+1.396	*Foods & Markets*, Sept., 1919, p. 15, N. Y. State Dept. of Farms & Markets
....	4.941	9.376	15.112	+.795	
....	7.810	.....	.....	.....	*Ibid.*, p. 17
....	8.436	.....	.....	.....	
....	6.359	7.255	13.538	— .076	Milk Survey of City of Rochester, New York, p. 159
....	4.361	7.255	11.289	— .327	
....	3.979	7.255	10.777	— .457	
....	5.796	.....	.....	.....	*Ibid.*, p. 154
....	6.251	4.949	.....	— .335	Report to Fed. Milk Commission for Ohio, spring, 1918
....	6.24	.....	.....	.....	Mich. Agr. Col. Special Bul. 99, p. 28

TABLE XXVI

Weighted Average Cost of Handling at the Plant—Twenty-eight Detroit Dealers (1915), Classified According to Size of Business [1]

	No. of quarts sold daily			
	Under 500	*500 to 1,000*	*1,000 to 2,000*	*2,000 or over*
Plants in group.....	5	6	7	10
	cents	*cents*	*cents*	*cents*
Average plant cost....	1.491	1.248	.9055	.7995

[1] Based on Table XXII.

TABLE XXVII

Weighted Average Cost of Delivery, Twenty-seven Detroit Dealers (1915), Classified According to Number of Delivery Wagons [1]

	Number of wagons per dealer		
	Under 5	*5 to 15*	*15 or over*
Number of dealers	17	7	3
Amount delivered daily	14,660	33,794	50,248
Cost of delivery per quart	*cents* 1.394	*cents* 1.282	*cents* 1.510

TABLE XXVIII

Weighted Average Cost of Delivery of Twenty-seven Detroit Dealers (1915), Classified According to Size of Load Delivered

	Size of Load		
	Under 300 quarts	*300 to 500 quarts*	*500 quarts or more*
No. of dealers	7	17	3
Quarts delivered daily	8,359	80,673	9,670
Cost of delivery per quart	*cents* 2.024	*cents* 1.368	*cents* 1.273

TABLE XXIX

Cost of Labor per Quart of Milk in the City of Rochester, New York, for 134 Dealers Grouped According to Size of Business [2]

Size of business	*Quarts received daily*			*All dealers*
	Under 500	*500 to 1,000*	*1,000 and over*	
Labor cost per quart	*cents* 2.394	*cents* 2.016	*cents* 2.716	*cents* 2.471

[1] Calculated from Table XXIII. [2] *Milk Survey of the City of Rochester*, p. 116.

Moreover, there is difficulty in ascertaining the true cost of delivering a quart of milk because of the fact that almost every dealer does a mixed business. Each delivers bottled milk at retail and at wholesale and usually some in cans. Each is likely to deliver cream in bottles at the homes or in cans to restaurants, etc. Then there is also the question of relative costs of supplying single pints or quarts. It costs more to deliver a gallon of milk in pint bottles than in quart bottles. It is hard to say how much more. It often happens that the same wagons in certain sections of a city perform all these services. Here, then, we have the problem of joint costs in all its complexities, and this problem the investigators in various cities have met in different ways, and hence for this reason alone cost figures would vary.

Section 10. Development of the Present System of Distribution

The present system of distribution is the result of development—not of retrogression. Our milk dealers have seen the advantages to be gained from the use of modern equipment, but have found that such equipment can be used profitably only with large volume of business. By the use of modern methods, which have often resulted in lower operating costs, and by putting on the market a superior, well-advertised article, the larger dealers have been able to take over more and more of the business. Instances of this have already been pointed out.

There is undoubtedly still much inefficiency in the milk business and a great deal of waste from duplication of effort and equipment, but conditions are certainly better

than they were. The leading dealers in many of our cities have made every possible attempt to conduct the business more economically, since it was only by so doing that they could meet the competition of the small, independent dealers and the producer-distributors and still be enabled to make a profit. As a result of the efforts of the more progressive dealers and producer-distributors, as well as of our health authorities, we are undoubtedly getting a better quality of milk than formerly in spite of the fact that it comes from more widely scattered sections.

Reference has already been made to the fact that there has been a notable tendency towards centralization, which in various instances has brought about considerable savings. As a result of numerous studies of milk distribution the feeling has come to be quite prevalent that the present wasteful competitive system of milk distribution should be superseded entirely by a centralized distributive system. The most elaborate study along this line is that made in 1919 by Dr. Charles E. North in Rochester, New York, for the Committee on Public Safety of the Rochester Common Council. The work of a large number of assistants, milk inspectors, public accountants, and others, after several months' effort, resulted in the collection of a mass of data dealing with the milk problem in Rochester and in several other cities. Many of the data have been published in an attempt to show the possible savings that would result were Rochester's milk business efficiently operated as a single system instead of under the present competitive plan. This phase of the study is summarized in Table XXX.

TABLE XXX

Final Summary of Estimated Savings Under Centralized System [1]

	Under present system		*Estimated under centralized system*		*Estimated savings*	
	Unit cost per qt. sold	*Total yearly costs*	*Unit cost per qt. sold*	*Total yearly costs*	*Unit savings per qt. sold*	*Total yearly savings*
Freight or trucking	.005855	$ 165,805	.005270	$ 149,225	.000585	$ 16,580
Labor	.025812	730,925	.014062	398,190	.011750	332,735
Factory, other than labor	.022056	624,548	.014464	409,572	.007592	214,976
Loss on surplus	.004237	119,976	.003500	99,118	.000737	20,858
Totals	.057960	$1,641,254	.037296	$1,056,105	.020664	$585,149

According to this table there would be a saving of about two cents per quart or 37.5 per cent of the cost of distribution as it was carried on in August, 1919. This would amount to a saving for the consumer of 14.8 per cent on his milk bill with milk selling at $13^1/_2$ cents.

The United States Bureau of Markets, in September, 1918, made a survey of milk marketing conditions in Kansas City in which this phase of the milk problem received attention. Table XXXI compares the cost of the present system in Kansas City with the probable cost of a centralized system. It will be noticed that the figures indicate a probable saving of six cents per gallon on the cost of distribution, reducing that cost from 14 to 8 cents per gallon. This is equivalent to a saving of 42.8 per cent of the costs obtaining in September, 1918, or a saving to the consumer of about 10 per cent, with retail prices ranging from 14 to 15 cents a quart.

[1] *Milk Survey of the City of Rochester*, p. 154.

TABLE XXXI

Comparative Estimate on Monthly Basis of Operating Costs Under Present Conditions and Centralized Plan [1]

	Present conditions		*Centralized plan*	
	No. of each item	*Amounts*	*No. of each item*	*Amounts*
Rents	(estimated) 171	$ 3,870	1 × $350	$ 350
Managerial expense	" 171	5,630	1 × $500	500
Interest charge	6% of $672,450	3,362	6% of $500,000	2,500
Employee expense	694 × $ 60	41,640	350 × $125	43,750
Horse maintenance	351 × $ 40.00	14,040	150 × $40	6,000
Wagon maintenance	152 × $ 10.00	1,520	100 × $10	1,000
Truck maintenance	104 × $100.00	10,400	60 × $60	3,600
Bottle loss	171 reported	2,047	1 × $500	500
Credit loss	171 "	1,662	1/10 of 1% of $400,000	400
Water expense	(estimated) 171	1,630	1	350
Cap expense	" 171	1,080	1	1,080
Processing incidentals	" 171	2,565	1	1,000
Coal & power expenses	" 171	3,680	1	2,500
Ice expense	" 171	6,020	ammonia	100
Repairs	" 171	1,620	1	1,000
Depreciation	10% of $672,450	560	1	450
Advertising	(estimated) 171	1,710	1	1,000
All others	" 171	6,000	1	3,000
Total		$108,032 14¢ per gallon		$69,080 8¢ per gallon

These are the conditions existing and the alleged possibilities. Who is to blame for the conditions? The public demands competition and becomes suspicious at mere size and complains at the least evidence of a milk trust. Undoubtedly economies would result, were an efficient centralized system established. But would they be as

[1] *Milk Marketing Conditions in Kansas City*, Sept., 1918, U. S. Bureau of Markets, unpublished report.

great as above indicated? Might not the abolition of the competitive system also remove the incentive for each to do his best which at present leads to constant improvement? Will the public take advantage of such possibilities as exist? Does it care to pay the price of making such a saving? By what means are such savings to be attained? These questions will be further considered in Chapter VII.

CHAPTER V

COLLECTIVE BARGAINING IN THE MARKETING OF WHOLE MILK

Section 1. Development of Collective Bargaining

THE idea of collective bargaining developed as a result of the introduction of the factory system of manufacturing, under which large numbers of laborers came to feel the need for united action in holding their own against the few controlling vast accumulations of capital. Under open competition as it then existed, the individual laboring man was an extremely weak bargainer in dealing with a big employer, and the laborer came to have altogether too small a share of the product of his industry.

Collective bargaining as we know it to-day has been defined as "a process by which the general labor contract is agreed upon by negotiation directly between employer or employers' associations and organized working men." [1] In some instances the bargaining is between an employer and his own workmen. In other instances it is between a group of employers and a combination of the working men of all of them, as in the case of the coal mining industry. The fundamental principle back of collective bargaining is "the substitution of the indispensable group as a bargaining unit for the dispensable individual." [2]

From the first collective bargaining was considered opposed to the public good and was dealt with accordingly.

[1] *Report of Industrial Commission*, Vol. XVII, p. 834 (1900).

[2] Carver, T. N., *Principles of Political Economy*, p. 403 (1919).

Under English common law it was held that whereas several men might individually demand higher wages, the moment they agreed among themselves to demand such higher wages or a change in hours, they were conspiring to interfere with the rights of third parties. This is the attitude which courts both in England and in America have taken almost to the present time. In 1824 and 1825 English laboring men were given the right to bargain collectively provided their agreements applied only to hours and wages of men directly involved. A half century later, in 1875, English laborers secured a considerable concession in the passage of the Trade Union Act, which provided that no action committed by a group of workmen was punishable unless the same act was criminal if committed by a single individual. In the United States the legal status of labor organizations late in the last century is thus described by the Industrial Commission: "The position of labor organizations under statute law and court decisions is a somewhat uncertain and anomalous one. Their powers and responsibilities are not clearly defined and are probably not very great." [1] It was not until 1914 that labor organizations were clearly given the right of collective bargaining in the passage of the Clayton Amendment to the Sherman Anti-Trust Law.

Collective bargaining on a large scale in agriculture is of much more recent origin than in industry, and it is now passing through a struggle to acquire a satisfactory legal status very similar to the earlier struggle of the labor unions for recognition. If one scans history, occasional early attempts at collective bargaining in agriculture are doubtless to be found. For example, following the Black Death in southern England, just after the middle of the

[1] *Report of Industrial Commission*, Vol. XXIII.

fourteenth century, there were combinations of agricultural laborers demanding higher wages and probably also of villiens demanding lower rents.[1]

The granger movement in the United States beginning in the late sixties was a most ambitious attempt to secure by collective action economic opportunity apparently not available to the individual farmers acting alone. The grangers proposed to deal collectively with large manufacturers so as to get cheaper or otherwise more satisfactory service, and actually succeeded in accomplishing this in many instances. Other organizations in various parts of the country have followed along lines very similar to those laid out by the early grangers. It is in the milk business that collective bargaining on the part of farmers has taken a form most nearly comparable with its form in the industrial field.

With the development of our large cities and the consequently increasing separation of the producers and consumers of milk, and with the concentration of the milk business of the cities in the hands of relatively few large dealers, the position of the milk producer has come to be very similar to that of the individual laborer. Along with these changes has come the modern demand for a sanitary milk, in the production of which larger and larger amounts of specialized capital are required. The modern dairyman supplying fresh milk for direct consumption must have a herd of high producing, often tuberculin tested cows, a well-equipped, sanitary barn, and usually a milk house furnished with cooling and cleaning facilities of modern type. Frequently milking machines are used for the milking. All of this means that the modern dairyman has a very heavy investment in a kind of capital so highly spe-

[1] Cheney, E. P., *Industrial and Social History of England*, p. 105.

cialized as to be suited only for this particular purpose. Thus it is difficult and expensive to shift to some other line of work in case milk production does not for a time appear profitable.

There is often no alternative outlet for milk which will adequately repay the use of the equipment installed for the purpose of supplying milk for city use, since, as already pointed out (Chapter III, Section 2; Chapter IV, Section 8); milk for the various alternative uses usually commands a lower price.[1] Even though producers were content with the lower prices offered by these competing demands, facilities for making such demands effective are often lacking in the milk-producing areas about our large cities, except in so far as the large dealers have equipped themselves to utilize their own surplus to the best advantage.

In addition to the above mentioned weakness of the individual dairyman as a bargainer, there is the fact that his product must be sold quickly and regularly. Milk cannot be allowed to accumulate. Nor can production be halted by even a few days while a new market is being sought or satisfactory prices being arranged. Each day's milk must be delivered to the consumer as quickly as pos-

[1] The U. S. Bureau of Markets reported average monthly net prices to producers supplying milk for different uses during 1919 as follows:

Milk for city distribution, per cwt	$3.50
Cheese manufacturing (average net price approximated by multiplying Plymouth, Wis., cheese board price of twins by 10 and adding 15¢ as compensation for value of whey), per cwt	3.04
Butter manufacturing (average net price approximated by multiplying the average monthly quotation of 92 score butter on the New York market plus 3¢ by the basic butterfat content of 3.5 per cent milk and adding 75¢ as compensation for the skim milk used on the farm)	2.98
Milk for condensing, per cwt	2.91

Market Reporter, April 17, 1920, p. 253.

sible, or be converted into some one of the more durable milk products.

Under these conditions the individual farmer is often at a disadvantage in marketing his milk. An unscrupulous dealer may tell him, during a flush season, that he can no longer use the dairyman's milk, since he can get cheaper milk from some other section, probably a section farther out from the city. Such a dealer could easily drop a few individual producers. Rather than be forced to look for a new market, such producers, acting individually, would very likely accept the low price offered. Thus dealers could undoubtedly, by playing one section against another, keep prices of milk at unduly low levels.

Section 2. Historical Sketch of Collective Bargaining in the Sale of Milk

Organization among milk producers has existed for approximately forty years. The organizations range from local groups of farmers held together by mutual grievances or ambitions of a more or less temporary character to associations including thousands of members. For the most part, as interest in the particular problems which had brought the members together died out, the various groups either disbanded or were represented for a time by mere handfuls of men. They paved the way, however, for wider organization, and in the middle and late nineties a number of producers' associations of a more permanent and more ambitious character made their appearance throughout the eastern and middle western dairy states. These, in turn, have led, more or less directly, to the formation of present day organizations.

In New York State the first definite action towards

collective bargaining by milk producers occurred in March, 1883, among the farmers of Orange County who were shipping milk to New York City. Many of the city milk dealers, the farmers claimed, lowered the price paid the producers whenever they could, or they did not pay for what they bought. The farmers, eight hundred of whom had formed an association, and the dealers met late in February, 1883, to decide upon the price of milk.[1] The dealers were paying three cents per quart at the depots along the railroads for milk which retailed in the city at ten cents. The dairymen demanded three and a half cents.[2] Since no agreement could be reached, the producers held a general mass meeting and passed a resolution that all milk should stop the next night. Accordingly 104,000 quarts were held back voluntarily,[3] and organized groups of men emptied the milk from the cans of those who attempted to ship to New York.[4] After three days of this warfare, the farmers secured nearly all of the increase demanded. They were able to maintain the price for their milk throughout the remainder of the year and the first six months of 1884. This association was still in existence in 1887,[5] but the need for wider organization was coming to be felt. Plans were generally discussed for the building of coöperative milk plants and creameries which would take care of the surplus and thus, in preventing the flooding of the market, keep up the price of milk.[6] To make this plan effective it was necessary to unite producers in the five states from which New York City re-

[1] Report of N. Y. Dairy Association meeting for 1885.
[2] *Cultivator & Country Gentleman*, Mar. 29, 1883.
[3] Report of N. Y. Dairy Association meeting for 1885.
[4] *Cultivator and Country Gentleman*, Mar. 29, 1883.
[5] *Ibid.*, June 30, 1887.
[6] *Rural New Yorker*, Feb. 25, 1888.

ceived most of its supply,—New York, New Jersey, Connecticut, Massachusetts, and Pennsylvania,—and early in 1889 an organization later known as the Five States Milk Producers' Union was formed in Oxford, Chenango County, New York.[1] In October of the same year three hundred farmers met at Middletown, Orange County, to further plans for organizing branch unions on all railroads shipping milk to Greater New York.[2] Ten thousand producers were supplying the city of New York at that time, and these, it was claimed, because of lack of organization, were helpless in the hands of about one hundred organized dealers. The ultimate object of the association was the formation of a coöperative stock company capitalized at about $500,000 to furnish milk direct to consumers, a plan said to have been in successful operation in London at that time for nineteen years.[3] The farmers were to take a twenty-five dollar share for each can of milk of forty quarts furnished daily. An agent at each shipping point was to receive and forward the milk and cream to a central depot just outside New York City.[4] This ambitious plan, however, was not be to taken up until extensive organization of local unions had been effected, and this organization required time. The work of the producers' union was not spectacular, but it accomplished a great deal in uniting scattered farmers and acting as an agent through which their claims might be stated and pressed in dealing with the Milk Exchange. Late in 1891, for example, the union won a case in which it charged the New York Milk Exchange with being a combination

[1] *Cultivator and Country Gentleman*, Oct. 31, 1889.
[2] *Ibid.*, Oct. 24, 1889; *Ibid.*, Oct. 3, 1889.
[3] *Ibid.*, Oct. 31, 1889.
[4] *Ibid.*

which had "unlawfully assumed to control the milk market by arbitrarily fixing prices and other means to the detriment of the producers and consumers." [1] The activities of the union were confined principally to the organization of locals for some years after this.

The union was still in existence in 1897 [2] when excitement over a gigantic milk trust said to be forming in New York [3] gave fresh impetus to activity among the milk producers and resulted in 1898 in the formation of the Five States Milk Producers' Association [4] which before the end of that year attained a membership of 3,715 producers.[5] The building of local creameries was urged as a means of combating the city dealers.[6] In 1899 the association numbered eight thousand members, representing ownership of two hundred thousand cows,[7] and controlling twenty thousand of the twenty-five thousand cans of milk daily shipped to New York City.[8]

A big contract was made with The Consolidated Milk Company, which was to purchase the milk from the association at a higher price than the dealers' organization would pay,[9] but this company failed to live up to its contract,[10] and the producers were compelled to make terms with the milk dealers. That such terms were not satisfactory to the former is evidenced by the unrest among

[1] *Cultivator and Country Gentleman.*, Oct. 15, 1891.
[2] *Ohio Farmer*, Dec. 23, 1897.
[3] *Hoard's Dairyman*, Sept. 24, 1897; Mar. 4, 1898.
[4] *Cultivator and Country Gentleman*, Mar. 24, 1898; *New York Produce Review*, July 3, 1901.
[5] *Ibid.*, Oct. 27, 1898.
[6] *Ibid.*
[7] *New York Pro. Rev. & American Creamery*, Mar. 29, 1899.
[8] *Hoard's Dairyman*, June 6, 1919.
[9] *Ibid.*
[10] *Ibid.*, Apr. 14, 1899.

them during the next few years, an unrest expressed in schemes to sell their milk to cheese and butter factories [1] and in negotiations with rival distributing agencies in the city.[2] A result of this unrest was the impetus given to the organization of coöperative stock companies and the building of creameries. Largely through the pressure brought to bear by the Five States Milk Producers Association, in the summer of 1900 the producers received an increase in the price paid them for milk of one-eighth of a cent per quart.[3] This increase, though small, at least admitted the association as an element to be consulted in determining milk prices. Later the association attempted to establish a schedule of prices which the members must be paid for their product, but the milk exchange failed to comply with such a schedule, and constant warfare resulted between the two organizations.[4] More and more creameries continued to appear throughout the region supplying milk to New York. By 1903 the Five States Milk Producers' Association, through its members, was controlling nearly one hundred and fifty coöperative creameries,[5] and early in that year "the coöperative creameries, corporations, and associations supplying milk to Greater New York and neighboring cities" formed themselves into a "Coöperative Creameries Association," of which the purpose was, so the resolution read, "to bring in close touch all coöperative creameries, in order that by united effort we may hasten the accomplishment of the work undertaken by the Five States Milk Producers'

[1] *New York Produce Review & American Creamery*, Mar. 21, 1900; *Ibid.*, July 25, 1900.
[2] *Ibid.*, May 23, 1900.
[3] *Ibid.*, July 18, 1900.
[4] *Ibid.*, July 3, 1901.
[5] *Hoard's Dairyman*, Apr. 24, 1903.

Association to secure uniform and remunerative prices for our milk." [1] This association coöperated closely with the Five States Milk Producers' Association, of which in fact it was really a branch.

In the summer of 1903 the Five States Association controlled about half the milk coming into the city of New York,[2] and an ambitious scheme gained favor about that time by which the entire milk supply controlled by the association was to be handled by the Peoples' Pure Milk Company, a $25,000,000 corporation, from which the farmers were to receive an increased price for their milk the year round. This plan failed, however, because the corporation was financially unable to meet the contract made with the sales committee of the association.[3] Several other attempts were made at various times to market the milk of the association members through some one large agency, but these efforts also failed, and interest in the association waned. By 1907 the meetings were unattended except by a mere handful of men, composed chiefly of the executive committee, and the organization was practically dead.[4] It had accomplished a great deal in educating the producers to organize and in hastening the building of coöperative creameries throughout the territory of its control.

About this time a new organization appeared in the territory supplying milk for the New York City market, namely, the Dairymen's League, which had a healthy start in a meeting of about seven hundred milk producers held at Middletown, New York, August 24, 1907.[5] The

[1] *New York Produce Review & American Creamery*, Apr. 1, 1903.
[2] *Ibid.*, July 22, 1903.
[3] *Ibid.*, Oct. 14, 1903.
[4] *Hoard's Dairyman*, Mar. 8, 1907.
[5] *Rural New Yorker*, Sept. 7, 1907.

league was incorporated under the laws of New Jersey, and included members from New Jersey, Pennsylvania, Vermont, Connecticut, Massachusetts, and New York, representing the ownership of fifty thousand cows.[1] The growth of the organization, though fairly steady, was slow. During 1915 there was no active organization because the league was unable to secure enough new names to pay organizers' expenses, but in the summer of 1916 there was a great revival of interest among the milk producers, and many new members joined the association. The league planned to be the agent, throuh a committee, for the sale of the milk of its members and to organize local branches at any point where there was a condensery, creamery, or shipping station. In September and October, 1916, the league won a boycott which it conducted against the milk dealers.[2] By April, 1917, the league numbered 40,420 members, organized into 791 local unions and representing the ownership of 493,848 cows.[3] The present status of the Dairymen's League is discussed elsewhere.

The Boston Milk Producers' Union was organized about 1886.[4] For some years it was said to be fairly successful in maintaining the price of milk in face of a decline of prices for other farm products, and consequently milk production increased, causing in turn an increased surplus. About 1897 the surplus question, which had long been a source of contention, began to loom very large.

In 1901 the producers' union had promoted uniformity of prices and business-like methods.[5] It had even at-

[1] *Prelim. Rept. of N. Y. State Legislature Joint Committee on Dairy Products, Livestock & Poultry*, 1917, pp. 295–339.

[2] *Ibid.*

[3] *New York Produce Review & American Creamery*, May 30, 1917.

[4] Rept. of U. S. Industrial Commission, Vol. VI, p. 407.

[5] *Ibid.*, p. 408.

tempted to dictate prices, which were to be determined by a rather unique method. Blanks were sent to producers, who thereon estimated prices wanted and amount of milk to be shipped. These prices were then averaged on the basis of number of cans to be shipped.[1] The union at that time had the machinery for a strike, but a strike had not so far been necessary, although several threats had been made.[2]

In the fall of 1903 the Milk Producers' Union was said to control five-sixths of the entire milk supply within one hundred miles of Boston.[3] About this time argument over the surplus question became very bitter, and the producers repeatedly threatened to strike if their demands were not met.[4] The milk dealers were willing to arbitrate on the question of price, but not on the question of surplus. According to the surplus clause of the contract which the producers were asked to sign, the dealers bought the producers' milk in an unlimited quantity and used the surplus for the manufacture of butter. The farmers then received butter prices for such surplus. The difficulty was that the farmer never knew for what part of his product he was to receive the milk price, and for what part the butter price.[5] A further clause in the contract between the producers and the milk dealers read: "If any producer produces in any one month less than one-half the quantity that he delivers in the largest preceding month, that difference between one-half and the amount delivered shall be figured per can at the difference between the card price and the butter value of the milk, and

[1] Rept. of U. S. Industrial Commission, Vol. VI, p. 407.

[2] *Ibid.*

[3] *New York Produce Review & American Creamery*, Oct. 7, 1903.

[4] *Ibid.*, Nov. 18, 1903.

[5] *Ibid.*, May 29, 1901.

that amount shall be deducted from the monthly bill in settlement." [1] This involved method of penalizing the producers meant a burdensome fine whenever a milk shipment fell below one-half the amount shipped in the largest preceding month. One shipper, to quote an extreme example, shipped only 71 cans of milk in August, whereas he had shipped as many as 444 cans in April. As a consequence, under this system of penalization, he received a check at the end of August for twenty-four cents.[2] The controversy of 1903 ended virtually in victory for the producers, since the agreement reached enabled the farmer to know before he shipped his product just how much he would receive for it and at the same time did away with the burdensome penalty clause for shortage in shipments.[3]

In 1904 the Milk Producers' Union changed its name to "The New England Milk Producers Association" [4] and formulated plans for the formation of an association or stock company called the Boston Coöperative Milk Producers' Company, which was actually organized in the spring of 1904. Each member held one share of stock and was required to rate himself reasonably near as to the number of cans of milk he could furnish.[5] The Boston Milk Producers' Company was well supported by the farmers for some years, and after its organization there seems to be no record of activity by the old union. In 1910 it was sufficiently strong and active to conduct a strike.[6] About the end of 1912 the company was dissolved by court action on charge of having violated the

[1] *New York Produce Review & American Creamery*, Nov. 18, 1903.
[2] *Ibid.*
[3] *Ibid.*, Nov. 25, 1903.
[4] *Ibid.*, Feb. 3, 1904.
[5] *Ibid.*, July, 1904.
[6] *New England Dairyman*, Feb., 1919.

Sherman Anti-Trust Law.[1] In February, 1913, the New England Milk Producers' Association was formed.[2] In December, 1916, a movement was started to extend the organization over all New England, with subdivisions dealing with other markets than Boston. This movement met with considerable success, and after the laws of Massachusetts were amended for that purpose, it was incorporated as the present organization in June, 1917.[3]

About 1883 the milk producers along some of the main lines of railroad running into Philadelphia organized to resist the exactions of milk dealers. Soon afterwards producers along other roads organized, but, because they were not prepared to take care of the surplus, none of these organizations were able to withstand the pressure brought to bear by the milk dealers.[4] For four years no further attempt was made by the producers at organizing, but in the winter of 1887, when the dealers put the price of milk down below cost of production, organizations were again formed, and this time upon a basis of coöperation which made them sufficiently strong to compel the dealers to pay the price or go without milk. Provision was made to handle the surplus and maintain price. In each neighborhood from which milk was shipped, a local organization was formed. These along each railroad were formed into a general association, which sold milk to dealers and hotels.[5] It maintained a plant in Philadelphia to which all unsold milk was taken and made into butter.[6] It attempted to pay shippers milk prices for all they produced and pro-

[1] *N. H. Extension Bulletin No. 8*, p. 42; letter from R. Pattee.
[2] *Ibid., No. 8*, p. 42.
[3] Letter from R. Pattee, managing director N. E. M. P. A., May 10, 1919.
[4] *Rural New Yorker*, Aug. 3, 1895.
[5] *Ibid.*
[6] Letter from J. Walter Pancoast, Woodstown, N. J., May 17, 1919.

rated the loss for that part of the milk worked up into butter.[1] High freight and overhead expenses, the lack of a good market for skimmed milk, and loss partly due, it is claimed, to the watering of milk by producers formed an obstacle too great for the United Association, and finally the association confiscated one whole month's shipments of many of its members to pay back losses. After that it disintegrated rapidly.[2] The dealers, moreover, were making a vigorous fight against the union. The larger dealers bought or established creameries and butter factories in various sections of western Pennsylvania and central and western New York, thus reaching out for their supply beyond the territory controlled by the association. The introduction of so-called "foreign" milk into Philadelphia was a factor for many years in depressing the price to the producers. The organization was strongest from 1890 to 1895 [3] and the New Jersey branch of the organization lasted until after the formation of the Philadelphia Milk Shippers' Union.[4]

The pioneer movement from which the Milk Shippers' Union developed started in New Jersey about 1896. The Union was organized on a small scale about 1898,[5] but was not strong nor especially active for some years. Indeed the Report of the United States Industrial Commission for 1900 makes the statement that the Philadelphia milk producers were unorganized at that time.[6] By December, 1904, however, the Milk Shippers' Union included nearly all the leading shippers of milk to the Philadelphia mar-

[1] Letter from J. Walter Pancoast, Woodstown, N. J., May 17, 1919.
[2] *Ibid.*
[3] *Rural New Yorker*, Aug. 3, 1895.
[4] Letter from J. Walter Pancoast.
[5] *Ibid.*
[6] Report of Commission, Vol. VI, p. 390.

ket.[1] The union existed at least nominally until the organization of the Inter-State Milk Producers' Association in 1916, at which time the old association turned over its activities to the new organization.[2]

The Inter-State Milk Producers' Association was incorporated in Delaware in 1917, and in 1919 numbered about 8,500 members grouped into 156 local organizations and controlling about 70 per cent of the milk supply of the Philadelphia district.[3]

A short-lived organization appeared in the Baltimore milk district in the early spring of 1899 under the name of "United Milk Producers' Association." [4] This association had a large plant located in Baltimore and did a very considerable amount of business for about a year and a half.[5] The plant, however, found strong competition in private concerns.[6] Its milk shippers were paid a higher price for their product than they had ever received before, and the consumers paid less for what they received. Hence the association was under a heavy financial strain.[7] Moreover, whereas 90 per cent of the producers had promised to join the organization, but 50 per cent actually came in, and lack of complete coöperation weakened the association.[8] In the fall of 1900 the concern passed into the hands of a receiver, and reorganization was not effected.[9]

Organization about cities farther west was taking place

[1] *New York Produce Review & American Creamery*, Dec. 7, 1904.
[2] Letter from Robt. W. Balderston, July 24, 1919.
[3] Information given by Sec. Philadelphia Milk Producers' Asso., June, 1919.
[4] *Hoard's Dairyman*, Aug. 31, 1900.
[5] *Ibid.*
[6] *Ibid.*, Dec. 7, 1900.
[7] *Ibid.*
[8] Letter from Jos. Hoopes, Belair, Md., July, 1919.
[9] *Hoard's Dairyman*, Dec. 7, 1900.

during the same period in which the eastern cities were organizing. The Milk Producers' Union, composed of producers supplying Cleveland, was organized in 1887,[1] mainly for the purpose of bettering its members' market. It was still in at least nominal existence at the end of the year 1894.[2] About 1897 the Northern Ohio Milk Producers' Association was organized to fight for better prices for the producers' milk.[3] This organization seems to have existed continuously until 1916, when it received added impetus and gained many new members.[4] In April, 1919, it was reorganized and incorporated under the name of The Ohio Farmers' Coöperative Milk Company.[5]

The first definite effort at organization in the Pittsburg region occurred in the spring of 1889, when three hundred twenty farmers organized about April 1, for "protection and mutual aid."[6] The milk dealers fought this organization vigorously, however; some of the members weakened; lack of unity existed in the organization; and in May of the same year it broke up entirely. On the 7th of September, 1894,[7] the milk shippers supplying milk to Pittsburg from the sections lying near the Panhandle railroad met to organize for "protection and regulation of wholesale milk prices in Pittsburg."[8] On October 1, this new organization held a meeting at Pittsburg to

[1] *Cultivator and Country Gentleman*, Sept. 23, 1887.

[2] *Ohio Farmer*, Dec. 20, 1894.

[3] Letter from W. H. Ingersoll, now pres. Ohio Farmers' Coöp. Milk Co., Apr. 19, 1919.

[4] Letter from Z. A. Kent, Aurora, Ohio.

[5] Letter from H. W. Ingersoll.

[6] *National Stockman & Farmer*, Apr. 18, 1889.

[7] *Ibid.*, Sept. 27, 1894.

[8] *Ibid.*

which were invited shippers on all railroads leading to the city.[1] A broader organization was formed composed of shippers from "western Pennsylvania, Ohio, and West Virginia and all localities shipping milk and butter into Pittsburg and Allegheny and surrounding boroughs."[2] It was agreed to form a central organization composed of delegates from locals,—one delegate to every ten shippers.[3] This organization grew rapidly, and locals were formed at almost all shipping points leading to the city.[4] The organization secured the good will of the milk dealers to the extent that the latter stated that they would be glad to work in harmony with the shippers' union and would even refuse to purchase milk from shippers who refused to become members of the association and subject to its wholesome regulations.[5] In 1903 the Milk Producers' Association of Western Pennsylvania and Eastern Ohio, probably the same organization, had three hundred members. They planned at this time to place agents at all shipping points and an agent in the city of Pittsburg to have charge of selling the milk to the dealers. The association required that all milk shipped must be pure.[6] Nothing much is known of the activities of this group of dairymen for a number of years. The Northeastern Ohio Milk Producers' Association was organized about the fall of 1916.[7] The organization of this association in turn led, in the summer of 1918, to the formation of The Dairymen's Coöperative Sales Company, with headquarters

[1] *National Stockman & Farmer*, Sept. 27, 1894.
[2] *Ibid.*, Oct. 11, 1894.
[3] *Ibid.*
[4] *Ibid.*, Jan. 17, 1895.
[5] *Ibid.*, Dec. 13, 1894.
[6] *New York Produce Review & American Creamery*, Oct. 7, 1903.
[7] Statement of A. W. Place.

at Youngstown, Ohio. This company is at present active in the Pittsburg district.

The most conspicuous example of early organization in the Middle West is that in the Chicago milk district. As far back as 1887 an organization called the Milk Shippers' Union of the Northwest existed and had proposed an ambitious scheme for the formation of a great company to monopolize the entire milk business of Chicago. Any farmer producing one can of milk a day was to be entitled to at least one share of stock, and no non-producer was allowed to belong to the company. The obstacles foreseen by milk dealers, who prophesied failure of the plan, proved true. The producers were not prepared to organize an association sufficiently strong to control a territory so vast, shipping milk from so many different directions.[1]

The next effort at organization did not come until 1896,[2] when a large number of milk shippers tributary to Chicago organized themselves into a union with locals at every station, for the purpose of protection against irresponsible milk dealers [3] and to promote the mutual interests of milk shippers. This association was incorporated as "The Milk Shippers' Union." [4] Towards the beginning of 1900 the union, taking the stand that tuberculosis does not affect the milk of a cow, was active in fighting against control in regard to this matter.[5] The Milk Shippers' Union was moderately active for about ten years. Its activities had largely to do with the setting of prices. A

[1] *Rural New Yorker*, Sept. 17, 1887.

[2] Letter from W. J. Robinson, Sales Mgr. of the Milk Producers' Coöp. Marketing Co.

[3] *Hoard's Dairyman*, April 16, 1897.

[4] *New York Produce Review*, Nov. 24, 1897.

[5] *Ibid.*, Nov. 29, 1899.

stronger organization, the Milk Producers' Association had appeared, however, to carry on the work which had first caused the formation of an association, and in June, 1911, the union was dissolved.[1]

The Milk Producers' Association was organized in 1909 for the purpose of "improving the conditions under which milk is produced; improving methods of marketing and co-öperating therein; standardizing the product; generally doing such other things as may be necessary to improve the quality, reduce the cost of production, increase the return to the producers, and to do all things necessary therefor."[2] The passing of an ordinance requiring that all milk brought into the city of Chicago be from tuberculin tested herds or be pasteurized was the immediate cause of the formation of the organization. It was able to defeat a somewhat drastic tuberculin test measure introduced in the legislature, and in 1911 succeeded in getting a law passed denying any city, municipality, or corporation the right to demand the tuberculin test. There have been numerous price controversies, though the companies have usually been the stronger bargainers. In the spring of 1916, however, the farmers demanded $1.55 per hundredweight, whereas the dealers were offering but $1.33. On April 1 the producers called a "strike," which lasted until April 7, at which time the dealers gave in. Considerable milk had been shipped in from outside the regular milk district, but the farmers within the district had the situation so well in hand that the dealers were compelled to acknowledge defeat. The unusually successful outcome of the strike of April gave a great

[1] *Milk News*, June, 1911.

[2] Amended By-Laws and Amended Constitution, Milk Producers' Association Year Book, 1917.

impetus to the growth of the organization, and by the end of that year about 95 per cent of the shippers of the Chicago district were said to have joined.[1]

In 1916 the association organized the Milk Producers' Coöperative Milk Company, discussed elsewhere in this chapter. This company did not get into operation, however, until 1919.

The following list of associations with principal market centers about which each was organized and approximate dates of formation will give a resumé of the movement.

Name	*Principal Market Center*	*Date of formation*
A forerunner of Five States Milk Producers' Un. .	New York City	1883
Five States Milk Producers' Union	"	1889
Five States Milk Producers' Association	"	1898
Coöperative Creameries Association	"	1903
Dairymen's League	"	1907
Dairymen's League Coöperative Association	"	1919
Boston Milk Producers' Union	Boston	1886
New England Milk Producers' Association (Only a change of name from the preceding)	"	1904
Boston Coöperative Milk Producers' Company	"	1904
New England Milk Producers' Association (A new organization. Incorporated on non-stock non-profit basis in 1917)	"	1913
Scattered associations around Philadelphia	Philadelphia	1883
United Milk Producers' Association	"	1887
Philadelphia Milk Shippers' Union	"	1896
Interstate Milk Producers' Association	"	1916
United Milk Producers' Association	Baltimore	1899
Milk Producers' Union	Cleveland	1887
Northern Ohio Milk Producers' Association	"	1897
Ohio Farmers' Coöperative Milk Company	"	1919

[1] *Pacific Dairy Review*, Dec. 30, 1916.

Name	*Principal Market Center*	*Date of formation*
Milk Producers' Union	Pittsburgh	1889
Milk Producers' Association of Western Pennsylvania and Eastern Ohio	"	1894
Northeastern Ohio Milk Producers' Association	"	1916
Dairymens' Coöperative Sales Company	"	1918
Milk Shippers' Union of the Northwest	Chicago	1887
Milk Shippers' Union	"	1896
Milk Producers' Association	"	1909
Milk Producers' Coöperative Milk Company	"	1916

Section 3. Collective Bargaining in the Milk Business, 1919–1920

In order to gain information as to the nature and extent of present organizations for collective bargaining in the sale of milk to distributors, questionnaires were sent to eighty-six such organizations. Thirty-eight of these questionnaires were returned with more or less complete answers. Several more were returned with comments indicating that the associations had been merged with other organizations or had gone out of existence entirely.

Although milk producers in some parts of the United States have attempted collective bargaining for many years, the majority of the present organizations are of recent origin. Table XXXII shows the dates of organization of thirty-six of the associations replying.

It should be pointed out, however, that in some instances the present organizations have merely superseded earlier organizations which had existed in the same territory and which had failed or whose form was found unsuited to present day needs. A study of the price charts

in the chapter on prices reveals as the reason for the rapid increase in the number of organizations between 1916 and 1918 the fact that milk prices had lagged behind other prices in the rapid ascent growing out of the world war.

TABLE XXXII

Dates of Organization of Thirty-six Milk Producers' Associations

Year	*Number of associations formed*
1907	2
1913	3
1915	2
1916	6
1917	12
1918	8
1919	3

During the early part of the movement a large number of local organizations were formed, many of them independent of larger organizations covering the same general territory. The writer has the names of a considerable number of such associations scattered over Ohio, Michigan, the New England States, and other parts of the country, many of which are known to have now merged with larger associations. Many others have simply ceased to exist, and others are weak and ineffective as bargaining organizations.

The milk producers' associations are of two general types: first, voluntary associations; and second, incorporated associations or companies. Practically all of the smaller associations are of the former type. In the milk zones about our large cities, however, most of the associations are incorporated. Some of these, as for example the New England Milk Producers' Association, the United Dairy Association of the state of Washington, the Inland

Empire Dairymen's Association of eastern Washington and Idaho, as well as most of the group in California, are incorporated on the non-stock, non-profit plan. Most of the eastern and midwestern associations, however, are incorporated on the capital stock plan. This is true of such leading organizations as the Milwaukee Milk Producers' Association, the Milk Producers' Coöperative Marketing Company (Chicago), the Dairymen's League (New York), the Dairymen's Coöperative Sales Company (Pittsburg), the Inter-State Milk Producers' Association (Philadelphia), and the Twin City Milk Producers' Association (Minneapolis and St. Paul). Of thirty-six organizations thirty are incorporated and six unincorporated; and of twenty-eight incorporated associations eleven are on the non-stock, non-profit basis, and seventeen have capital stock varying from a few thousand to five hundred thousand dollars. Stockholding is quite frequently based on the number of cows kept. The Dairymen's Coöperative Sales Company, for example, require each member to hold at least one share with a par value of $2.50 and an additional one-tenth share for each cow above ten. A similar arrangement holds with regard to the Dairymen's League and the Inter-State Milk Producers' Association.

In the case of the non-stock association, the membership fee is also frequently based on the number of cows. The United Dairy Association of Washington is organized on the basis of ten dollars per cow, with a minimum of fifty dollars per member. The New England Milk Producers' Association, however, has a membership fee of but one dollar. The voluntary associations, as a rule, have nominal fees of about one dollar.

The larger associations are ordinarily composed of

locals, so as to facilitate expression of opinion in the handling of local problems. Eighteen associations report no locals. Fifteen report locals varying in number from 3 to 1,097, the latter being the number reported by the Dairymen's League. Since this association covers the large milk shed of New York City, many of its locals, in the vicinity of cities like Rochester, New York, are themselves associations of considerable size.

A number of associations have undertaken to solve the surplus problem by the acquisition of plants in which to manufacture the various dairy products. The Twin City Milk Producers' Association has twelve such plants, most of which are country creameries or cheese factories. The Milwaukee Association has such a plant; the Producers' Coöperative Marketing Company of Chicago has three; the New England Milk Prŏducers' Association has only recently taken over the Turner Center System; and a number of the western associations have acquired or built creameries or manufacturing plants for the utilization of their surplus. Among the California associations, for example, the Northern California Milk Producers' Association operates three plants. One of these, located in Sacramento, is equipped for the manufacture of casein, powdered milk, condensed milk, cheese, butter, and other by-products. The Milk Producers' Association of Central California has a creamery at Stockton and a large plant at Modesto equipped for the manufacture of milk sugar and dry skim milk.[1] The Associated Milk Producers of San Francisco have a plant at Holt and are erecting another at Los Banos. The San Joaquin Valley Association has two or three creameries and contemplates building a large manufacturing plant at some point in the

[1] *Fourth Annual Report of State Market Director of California*, 1920, p. 49.

San Joaquin Valley. The Imperial Valley Association has two creameries and is planning on a large manufacturing plant. The United Dairy Association of western Washington has recently taken steps to follow the example of the California group, and several of its county organizations have already acquired plants.[1] In the Dairymen's League territory elaborate plans are under way for the acquisition of the milk manufacturing business through the Dairymen's League Coöperative Association, which is being fostered by the League. A number of plants have been built or acquired under this coöperative association plan, the first of which was that at Auburn, New York. On April 10, 1920, plants were in operation under this plan at Auburn, Fort Plain, Canajoharie, Fonda, Holland Patent, Wallkill, and Williamstown, New York.[2] In many localities in New York farmers' companies have operated country plants for some years. One such plant, at Little Falls, New York, handled about 13,000,000 pounds of milk in 1919, and during the first eleven months of the year accumulated a surplus of $44,000.[3]

Only two associations report any distribution to the consumer—the Milk Producers' Coöperative Marketing Company (Chicago) and the Midwest Milk Producers' Association (Omaha).[4] Each of these is undertaking distribution on a small scale in addition to their other activities. A third, the King County Milk Producers' Association, a local branch of the United Dairymen's Association of Washington, is planning to take up the retail distribution in the city of Seattle in the near future.[5]

[1] *Northwest Dairyman & Horticulturist*, Mar., 1920, p. 3.

[2] *Dairymen's League News*, Apr. 10, 1920, p. 10.

[3] *Milk News*, Jan., 1920, p. 6.

[4] The New England Dairymen Association is also distributing some milk.

[5] *Northwest Dairyman & Horticulturist*, Mar., 1920, p. 3.

Of twenty-eight associations which answered the question regarding method found most satisfactory in arriving at prices, six stated that cost of production is considered or used as a basis; five use one or more dairy products having a quoted price as the basis; and fourteen report that bargaining with the dealers is found most satisfactory. Cost of production, which numerous associations seized upon during the war period as a panacea for their price difficulties, has been largely given up as a peace price determinant. Even of the six above mentioned as giving cost of production as the basis for price, several intimated that such figures are really used only as the basis for bargaining. The leaders are apparently coming to see that the true function of the association along this line is to facilitate the focusing of the forces of supply and demand and to make sure that the dairymen get their full share of the "bargaining margin."

The "strike," more properly called a boycott, has frequently been used as a weapon to enforce demands, usually in connection with attempts to secure higher prices for milk. At least as early as 1883 dairymen in Orange County, New York, made use of the boycott. During the period of rapidly rising prices following the outbreak of the war in Europe, producers used this method of enforcing their demands frequently. There is scarcely a large city which has not had one or more strikes within the past five or six years. Outstanding examples are the Chicago strike of the spring of 1916, as a result of which the producers asked and secured an average of $1.55 per hundredweight for the six summer months, after having been offered but $1.33, an increase of 22 cents per hundredweight. The strike lasted for twelve days. Another strike of importance was that in the New York milk zone

in August, 1916. Producers were offered $1.90 per hundredweight but demanded and received $2.15.

But boycotts are not by any means always successful. A long drawn out struggle may sometimes end with questionable results. In January, 1919, New York producers again boycotted the dealers. After a struggle of about twenty-five days, continued at great expense to both dealers and producers, most of the dealers finally agreed to pay the producers' price for the rest of that month. Thereupon the producers claimed a great victory.[1] The question may properly be raised, however, as to who really won the strike. Both sides lost heavily. The prices demanded and the prices obtained are as follows: [2]

	Jan.	*Feb.*	*Mar.*
Dairymen demanded per cwt.	$4.01	$3.86	$3.54
Dairymen received after Jan. 25 per cwt.	4.01	3.54	3.31

The boycott has proved expensive to both producer and dealer. Producers can seldom utilize milk to full advantage at home for such short periods and often not at all. Dealers have to pay high prices for inferior milk obtained from distant points, if indeed boards of health permit it to be imported at all. A point often overlooked is that such a struggle means hardship for the city consumer. The result is ill feeling towards both distributor and producer, which may mean reduced consumption.

In contracting the prevalent practice is for the producer to contract with the association to consign to it all his milk except such portions as are used for home consumption. Only two associations report no contract, and only six report that the farmer contracts directly with

[1] *New England Homestead*, Jan. 25, 1919.

[2] *Creamery & Milk Plant Monthly*, Feb., 1919, p. 24.

the dealer. Nineteen report contracts with the association. Of fifteen contract forms at hand, one provides for a contract for one year with no renewal features, two provide for a continuous contract with annual periods for its discontinuance, if desired; and twelve are of the self-renewing type. The following from the contract of the Milk Producers' Coöperative Marketing Company of Chicago is fairly typical of this latter type:

". . . This contract shall be self-renewing annually for periods of one year each, beginning with the first day of January, 1921, unless either of the parties hereto shall notify the other party on or before thirty days before January 1 in any year of his intention to terminate the same on the first day of January following such notice."

A considerable number of the contracts contain the so-called "liquidated damage" clause, by which the producer binds himself to consign his entire output to the association for the periods stated and agrees that, in case he defaults, the association is to be reimbursed in a certain amount previously agreed upon as liquidated damages, since the actual amount of damage suffered by the association because of his breach of contract is difficult to ascertain. Table XXXIII gives the amounts of such liquidated damages and the basis upon which each is determined in seventeen associations.

The securing of adequate revenue has been a serious problem with many of the associations. The ordinary annual dues do not usually go far. It has been felt that expenses should be shared more nearly in accordance with the benefits derived from the association. It is difficult, however, to collect on the basis of quantity marketed when individual members ship their own milk and receive their payments direct from the various dealers. To

overcome this difficulty and to save the expense of collection, some of the associations have hit upon the plan of having the dealer deduct the commission charge from the amount due each member and remit the amount of such commission in one lump sum each month to the association. In many instances dealers have readily complied, especially when the associations included a large proportion of their patrons. In Milwaukee the large dealers now deduct the commissions from the milk checks of all their milk patrons, whether such patrons are members of the producers' association or not. This is felt to be fair, since the non-member shares in any benefits resulting from the efforts of the association.

TABLE XXXIII

Basis upon Which Liquidated Damages are Determined in Seventeen Associations

Basis	*No. of Associations*
4 cents per gallon on outside sales	1
50 cents per cwt. of outside sales	1
15 per cent of value of outside sales	1
10 per cent of value of outside sales	3
All amounts due producer at time of violation	1
$5.00 per cow	7
$10.00 per cow	1
$35.00 for failure to live up to contract	1
Forfeiture of capital stock owned	1

In a number of sections payment for milk is made directly to the association. This makes possible prorating the returns from milk sold for different purposes and facilitates giving all members equal treatment, even though some milk must at certain seasons be diverted into channels paying less than regular prices. For example, when there is a surplus of milk for city use, and a part is tem-

porarily diverted to some cheese factory, the patrons whose milk is so diverted would suffer a loss. By having all payments made through the association, the latter can prorate such losses before making settlement.

Commissions charged for selling milk vary in form and in amount. Following are the commissions charged their members by twenty-one associations:

TABLE XXXIV

Commissions Charged by Twenty-one Associations

Commission	*No. of associations*
Actual cost	1
1½ cents per lb. of butterfat	2
1¼ cents per gallon	1
1 cent per gallon	1
½ cent per gallon	1
5 cents per hundredweight	2
1 cent per hundredweight	3
1 per cent of sales	1
½ per cent of sales	1
1 cent per 8 gallon can	1
Dues only	7

At Chicago, in 1916, the National Milk Producers' Federation was formed, composed of delegates from the various milk producers' associations, each of which is represented by one delegate having one vote.[1] The formation of the National Federation was an important step in the growth of the movement since it was in line with the general tendency toward organization on a national scale.

[1] *Marketing & Farm Credits*, National Conference on Marketing & Farm Credits, 1916, p. 430.

Section 4. Discussion of Specific Organizations

The New England Milk Producers' Association, as now organized, was incorporated June, 1917, under the Massachusetts law providing for non-profit, non-stock associations.[1] The association is organized into local associations, county associations, market associations, and a central association. The local associations are "composed of the dairy farmers in any vicinity who have subscribed to the by-laws and regulations of the New England Milk Producers' Association." [2] The county associations are in turn composed of delegates from three or more locals. The market associations are "composed of delegates from local associations whose members sell in any market other than Boston or New York." [3] The central association is made up of the presidents of the various county associations and is the governing body of the organization. It organizes for business by electing at its annual meeting a president, vice-president, treasurer, and clerk, and also a board of directors—two from each state. The central association may delegate to the board of directors any of its powers, and the directors may in turn delegate their powers to an executive committee composed of five of their own number. The membership fee is one dollar. Annual dues are "one-half of one per cent of the amount received . . . from the sale of dairy products, payable monthly at the principal office of the association." [4] The revenue from such annual dues is to go 85 per cent to the central association, 10 per cent to the local association,

[1] Letter from R. Pattee, Mgr. N. E. M. P. A., May, 1919.
[2] *New England Dairyman*, June, 1919, p. 5.
[3] *Ibid.*
[4] *Ibid.*

and 5 per cent to the county association. On January 1, 1920, the association had a membership of 20,714.[1]

In addition to maintaining an office force at Boston, the association has three branch offices, one at Worcester, Massachusetts, one at Lawrence, Massachusetts, and one at Providence, Rhode Island.[2]

Since April, 1917, the association has published a monthly paper called *The New England Dairyman*.

Arrangements have been made by the association to take over the Turner Center System—formerly the Turner Center Dairying Association—with headquarters at Auburn, Maine, for those of its members who supply milk in that territory. This system in 1919 purchased of farmers at its numerous creameries $4,890,187.87 worth of cream and milk.[3] Though the New England Milk Producers' Association as such is not taking over the system, it has done the work which will put it into the hands of the producers who sell their milk through the system. Since the plan calls for an investment of over thirty-two dollars per cow, a novel method was adopted for making the transfer from the present holders to the new.

"The plan . . . calls for the establishment of a trust fund to acquire the stock of the Turner Center Association. This trust fund will be administered by a board of trustees selected by the option holders (a committee of the New England Milk Producers' Association who had an option on the stock of the company and made the transfer arrangements).

"These trustees will serve for five years, unless they

[1] *Hoard's Dairyman*, Mar. 12, 1920, p. 484.

[2] *New England Dairyman*, Dec., 1919, p. 3.

[3] *37th Annual Report Turner Center System*, 1919, p. 4.

sooner accomplish their job of acquiring, reorganizing, and extending the Turner Center facilities or are discharged. They, as trustees, are entirely a separate and distinct organization from the New England Milk Producers' Association. . . . They will simply use the trust funds to purchase stock in the Turner Center Association, a Maine corporation. To raise the amount required, each Turner Center patron will be asked to pay in the form of cash or negotiable note $10 per cow. Subscriptions to the trust fund may be received from others. Each patron will also pledge 5 per cent of his monthly milk check to the trust funds. For each $10 contributed to the fund, a share will be issued bearing 6 per cent interest.

The amount so raised will be used to purchase stock in the Turner Center Association. The trustees will thus gradually acquire the majority stock interest and be able to reorganize that concern on a coöperative basis. The 5 per cent contributed from milk checks will, in five years, enable the trustees to acquire all the Turner Center stock and pay back the first contribution of $10 per cow. This being done, it appears that each producer will have contributed to the trust fund a percentage of his business and will own in that fund exactly according to his patronage. The fund being invested in Turner Center stock, the producers will through trustees own that stock upon the basis of business done through the concern. The trustees will then reorganize the Turner Center corporation and issue stock therein to the shareholders in the trust fund, each according to his contribution.

* * * * * * * *

"Under this plan products may be bought of non-members, but such will not receive any benefit from the profit sharing feature or any ownership or interest in the busi-

ness. The corporation . . . to be delivered to the investors by the trustees will provide in its by-laws that each year from the receipts of each member patron a deduction of not more than 5 per cent shall be made to pay off those who invested years before.

"Thus a man whose contribution the first year amounted to $100 would get 10 shares of that year's issue. Five years later there would be deducted enough to take up those shares and new ones would be issued to those from whom the deduction was then made. In this way one-fifth of the whole amount of stock outstanding will be retired each year and new stock issued to the producers who furnish the money to retire the old.[1]

One of the most successful organizations for collective bargaining is the Dairymen's Coöperative Sales Company, organized in the spring of 1918 to sell the milk of the producers in the Pittsburg district. It should be said, however, that its success is due not so much to the form of the organization nor to its method of operation as to the attitude with which the problems of selling milk have been approached. This attitude is to be explained largely by the fact that the association had had on its board of directors men who saw clearly the real problems to be met and who were willing to face them frankly. There is also the further fact that the association early had the advangage of having at many of its meetings with the dealers a man in whom all three interested parties,—producers, dealers, and consumers—had confidence.

The following quotation from a Pittsburg farm paper, referring to a milk price conference, gives a good idea of how the problem has been approached and of how the plan works:

[1] *The New England Dairyman*, Sept., 1919, p. 2.

"The method of adjusting prices is very simple. A joint committee is selected, consisting of dealers and the directors of the Dairymen's Coöperative Sales Company. In the meeting both sides lay all their cards on the table and jointly strive to find a basis which is equitable to consumers, producers, and distributors. In this instance the producers thought costs and other conditions justified a price of $3.25 per hundred pounds, but distributors showed that the existing surplus is much larger than producers had supposed. Their figures were properly attested by disinterested parties and were accepted by producers as correctly representing the situation. After some discussion, all agreed that conditions warranted a reduction of one cent a quart to consumers and a price of $3.00 per hundred pounds to producers for 3.5 per cent milk at country plants, or 33 cents per gallon for local milk at Pittsburg. . . . . Dr. Clyde L. King, who has the confidence of all parties, helped to adjust matters and declared that the conclusions were equitable.

"The success of the plan followed here and in Philadelphia is the result of adhering to sound business principles. All parties recognize the fact that prices must be governed by supply and consumption; that consumers, producers, and distributors are all dependent on each other and have their respective rights; and that the essential thing is equity to all. As a consequence we now have confidence and good will in the milk business where we used to have suspicion and disagreements of various kinds." [1]

The organization is incorporated under Ohio laws, with capital stock of $25,000 divided into ten thousand shares of a par value of $2.50 each. Each member is required

[1] *National Stockman & Farmer*, Mar. 8, 1919, p. 3.

to subscribe for a minimum of one share and an additional one-tenth share for each cow above ten. The members hold their membership directly in the central organization, but are grouped into locals about the various marketing centers.

The plan of organization of the company is unique in two respects. With producers scattered over a wide territory, there is always difficulty in keeping members in sufficiently close touch with the board of directors and officers. In order to bridge the usual gap and to make the association truly democratic, provision is made for an advisory council, composed of representatives of the local branches at the ratio of one councilman to every fifty members or major fraction thereof in a given local. Theoretically this council is "an organization of the stockholders for the purpose of looking after their interests and directing the general policies of the company." [1] The board of directors of the company is the executive committee of the advisory council. The board of directors have the privilege of the floor but may not vote. The officers of the company are ex officio officers of the advisory council. Special meetings of the advisory council are to be called by the president or secretary at the request of the majority of the board of directors or at the request of twenty-five members of the advisory council.

At the quarterly meeting held on the first Friday in June, the council places in nomination the names of not less than five stockholders to be voted upon at the annual election of directors for the ensuing year. It also appoints three tellers, who "shall meet at the principal office of the company on the fourth Saturday of June and shall count

[1] *Dairymen's Price Reporter*, Jan. 20, 1920, p. 2.

the votes for directors as returned to the secretary of the board of directors by the respective local branches." [1]

The advisory council conducts all investigations of charges of neglect of duty on the part of officers or directors; fixes the amount of commission to be charged on the members' milk; fills vacancies on the board of directors occurring between elections; and proposes amendments to the constitution for adoption by the stockholders.

The second unique feature in the organization of the Dairymen's Coöperative Sales Company is the method of conducting the annual election, which is held on the second Saturday of June of each year at the regular meeting places of the respective locals, where the members vote for directors of the company. The vote is there recorded "in duplicate by tellers appointed by the local branches, one copy to be retained by the local, the other, properly certified by the president and secretary of the local, to be returned to the secretary of the board of directors, who shall meet with the tellers appointed by the advisory council on the fourth Saturday of June at the principal office of the company, when the entire vote shall be counted and the (5) persons receiving the highest number of votes shall be declared elected directors for the ensuing year." [2]

The Dairymen's League, Incorporated, is a New Jersey organization[3] incorporated in 1907 with $100,000 of capital stock divided into shares of the par value of $2.50. The capital stock was increased in 1919 to $500,000 to accommodate additional members.[4] Shares are held on the

[1] *Dairymen's Price Reporter*, Jan. 20, 1920, p, 2.

[2] *Ibid.*, p. 13.

[3] Sometimes incorrectly called the New York Dairymen's League because of the fact that it operates largely in New York State.

[4] *Dairymen's League News*, Jan., 1919, p. 7.

basis of one-tenth share per cow. Any person or firm producing milk may become a stockholder. Shares are not transferable until the secretary has been given thirty days' notice of intention to sell. The corporation reserves the right to buy at par value.

The plan of organization is to group the members into local and county associations. Members of the league at any shipping point may organize "to assist the directors and facilitate the business of the company and transact such other business of the company as its members may decide, if it does not conflict with the purpose of the organization." [1] County associations may be formed by the members in any county. At a meeting of a county association the voting is done by the presidents, secretaries, and treasurers of the various local branches in the county.[2]

At an election of the Dairymen's League the voting is by shares, in person or by proxy. At the annual meeting held in December, 1918, over twenty-four hundred stockholders were in attendance.[3] Delegates from the various local branches are expected to secure proxies from as many as possible of their local members.[4]

In addition to the proceeds from the sale of capital stock, the league gets a considerable amount of revenue from commissions on sales of milk levied at the rate of one cent per hundredweight. For the twelve months ending November 30, 1919, the revenue from this source was $270,695.26. Of the fund resulting from this one cent per hundredweight commission, the league is now

[1] Proposed By-law for Local Branches.
[2] Proposed By-laws for County Associations.
[3] *Dairymen's League News*, Mar. 25, 1919, p. 1.
[4] *Ibid.*, Dec., 1918, p. 5.

returning to each local thirty cents for each member paying the commission.[1]

The league is really governed by twenty-four directors, selected for one year. They are selected by districts, into which league territory is divided.[2] At its first meeting a newly elected board of directors chooses from among its own members the president and vice-president. It then elects four other members of the board to act with the president as an executive committee.[3]

Prices are arranged by the executive committee, sometimes after consulting with the board of directors.[4] A coöperative plant department has been organized and has sold milk for coöperative plants which were in a position to ship milk directly to dealers in New York City. During eleven and one-half months, ending November 30, 1919, this department sold $1,008,901.60 worth of milk.[5] Milk is sold by the league for members, who contract directly with the association. The contract is of the self-renewing type, running for six months' periods, at the end of any one of which a member may withdraw. If a member fails to comply with his contract, he must pay liquidated damages amounting to five dollars per cow.

Since February, 1917, the league has published the *Dairymen's League News*, first as a monthly and at present as a bimonthly publication.

For a number of years, or since 1916, plans have been discussed for the reorganization of the Dairymen's League.[6] In January of 1919 the dairymen and dealers

[1] *Dairymen's League News*, Jan., 1919, p. 7.
[2] *Ibid.*, Dec. 10, 1919, p. 12.
[3] Printed Constitution and By-laws, p. 6, 1916.
[4] *Dairymen's League News*, Feb. 10, 1919, p. 1.
[5] *Ibid.*, Dec. 10, 1919, p. 21.
[6] *Ibid.*, Dec. 10, p. 11.

failed to agree on a price, and this disagreement resulted in a boycott of the dealers during the first twenty-five days of January. This difficulty brought to a head the idea of reorganization, which then took the form of a plan to organize all the dairymen in the New York milk shed into one vast coöperative association which should take over as rapidly as possible the entire milk business for the territory.[1] The plan at present is to take up first the manufacturing end in the country, because that is the end with which the farmers are the most familiar and also because it constitutes two-thirds of all the milk production of the Dairymen's League members. City distribution may be the next step, if this first step succeeds.[2]

The Dairymen's League Coöperative Association was incorporated under Article 13A of the membership corporation laws of New York as revised in 1918. The incorporation took place late in March of 1919.[3] This association is strictly a non-stock, non-profit corporation and is, at least for the present, not to displace the league, but is to be a parallel organization.[4] Arrangements have recently been made whereby the directors of the new organization and of the Dairymen's League shall be one and the same.[5] The plan is for members of the Dairymen's League Coöperative Association to form local associations in the various marketing centers, which are to take over or construct local creameries, condenseries, or country milk plants. Later there are to be regional associations. The organization is being built up around the idea that all milk is to be pooled through the central

[1] *Dairymen's League News*, Feb. 25, 1919, p. 1.
[2] *Ibid.*, June 25, 1919, p. 1.
[3] *Ibid.*, April 25, 1919, p. 2.
[4] *Ibid.*, Apr. 25, 1919, p. 2.
[5] *Ibid.*, Dec. 10, 1919, p. 1.

association—to which all payments for sales are to be made.[1] As pointed out in the preceding section, this association has already acquired a number of plants, which are now being operated on the coöperative plan. All returns are to be prorated to the members, so that all members stand on an equal basis.

Voting in this association is to be entirely on a membership basis.[2]

The coöperative association is to be financed by a rotating fund method somewhat similar to the plan already discussed in connection with the New England Dairymen's Association. This plan can best be given by quoting from an article written by the president of the association, as follows:

"The financing of this proposition is to be accomplished by first securing loans from the producers, which loans are to be represented by certificates of indebtedness. The certificates are to be paid in five equal, yearly installments, with interest by deductions taken from the proceeds of milk after service charges have been deducted. This will result in the producers owning all of the facilities for handling the milk at the end of five years. It is then proposed at the end of each year to issue new certificates for the amounts deducted from each producer's milk, and this process to continue during the life of the association, so that the producer's investment in the plants will be represented by the service he has received from the plants." [3]

The Chicago Milk Producers' Association was incorporated February 26, 1909, as a non-stock company.[4]

[1] See By-Laws Proposed for Locals, *Dairymen's League News*, June 10, 1919, pp. 4 and 5.

[2] *Hoard's Dairyman*, Jan. 30, 1920, p. 76.

[3] Fuller, Bradley, in *Hoard's Dairyman*, Jan. 30, 1920, p. 76.

[4] *Milk News*, Oct., 1917, p. 2.

It was not very active until the spring of 1916, when it boycotted the Chicago dealers and obtained a higher price for its milk. As a result of this and other successes, it grew rather rapidly and soon included the major portion of the producers in the Chicago district.

It is organized into locals about the various shipping points, and the members in each county are also organized into county associations. Members hold membership directly in the locals, and the total membership of such locals constitutes the central association. "Any person, firm, or corporation engaged in the production of milk, any farm, or farm owner residing in and operating in the territory tributary to the city of Chicago, Illinois, may . . . become a member of the association." [1]

The members in each county form a county association, which elects a set of officers of its own. Each county association having fifty-one to one hundred members in good standing then elects a director of the central association. If a county association has more than one hundred members, an additional director may be elected for each additional three hundred members, but no county association may have over four directors. An annual meeting of members, at which officers are elected, is held at some point convenient to the greatest number of members of the central association.

The board of directors has general charge of the business of the association. It may also expel any member or remove any officer for cause after proper hearing. In August, 1916, it acted under this power to remove the president by expelling him from the association.[2]

In the spring of 1916 a movement was started within

[1] By-Laws in Year Book and Directory, 1917.

[2] *Hoard's Dairyman*, Sept. 8, 1916.

the association to perfect a stock company which should sell the members' milk and even acquire country plants, if necessary. After considerable controversy, the company was organized and enough stock sold to enable it to secure a charter, which it did on November 1, 1918. The company has a capital stock of $500,000, divided into ten thousand shares of the par value of $50. No member may own over five shares. It is said that there are not over twenty members out of about six thousand shareholders who have over one share.[1]

The company began operation February 15, 1919. Up to November 11, 1919, it had sold over $13,000,000 worth of milk.[2] The association is managed by an executive committee of five who have immediate supervision of the management.[3] The stockholders at each annual meeting elect nine directors for a term of three years, thus making twenty-seven directors. They in turn elect the officers from among their number.

The producers contract for the sale of their milk directly with the association under the self-renewing contract already quoted. The company then sells as best it can to the various dealers in Chicago and vicinity. The milk is paid for through the company, which in turn makes payments for milk coming from centers in which there are manufacturing plants through local banks in such centers. A commission of one per cent of sales is charged to cover its operating expenses. A slightly higher charge is made on can shippers who ship directly to Chicago.[4]

A group of organizations worth noting is that in Cali-

[1] *Milk News*, June, 1919.
[2] *Prairie Farmer*, Nov. 12, 1919, special edition.
[3] *Milk News*, Jan., 1920, p. 2.
[4] *Ibid.*, June, 1919, p. 6.

fornia. There are at least eight important association and two or three smaller ones, all but one of which are organized on a non-stock, non-profit basis. The first of these to be organized was the Associated Milk Producers, Inc., supplying the city of San Francisco. This was incorporated March 16, 1916, with $50,000 capital stock.[1] In the next few years organization proceeded rapidly, the other associations being organized as above stated on the non-stock, non-profit basis. During the year ending December 1, 1918, this group of organizations handled about $20,000,000 worth of dairy products.[2] As noted in the preceding section, most of these plants have one or more local creameries, and several are providing themselves with elaborate utility plants in which any of the dairy products can be manufactured. In August, 1919, twenty-four such plants were in operation.[3]

To give a better idea of the plan of organization of these associations, we may look a little more carefully into the organization and operation of the Northern California Milk Producers' Association as being more or less typical. Any dairyman may become a member upon being admitted by a vote of the board of directors and upon payment of a fee of $5.00 for each cow owned by him, with a minimum fee of $10.00.[4] Members are given a membership certificate, which cannot be transferred or assigned, unless the board of directors sanction such a transfer or assignment.

The association is governed by a board of eleven directors, elected at the annual meeting of members. The

[1] *First Annual Report State Market Director of California*, 1916, p. 19.
[2] *Third Annual Report State Market Director of California*, 1918, p. 47.
[3] *Fourth Annual Report of State Market Director*, 1920, p. 44.
[4] By-Laws, 1919, p. 16.

members of this board at their first meeting elect the officers of the association. At least the president must be one of their own number. The directors may also provide for an executive committee from among their own members, with the addition of the state director of markets or some man named by him.[1] Provision is also made that the directors may provide for an auditing committee to be appointed from among themselves.

The voting is on the one-man-one-vote basis, but property rights are unequal. The articles of incorporation state that "the interest of each member in the property of the Association shall be in the same proportion as the amount of membership fee actually paid by him bears to the total amount of all membership fees paid by all members of the Association."[2]

The members of the association bind themselves by contract to sell all their milk through the association and agree to the following provision for liquidated damages:

"Each member of the Association has in these by-laws and otherwise agreed to market all of the milk, cream, butter, cheese and other dairy products produced or owned by him, through the Association. Each member admits that it would be extremely difficult and impracticable to fix or ascertain the amount of damages which the Association or its members would suffer if one or more of its members should neglect, refuse, or fail to keep and perform the terms and conditions and agreements herein and in his marketing contract contained, for which reason it is expressly understood and agreed by and between each of the members of the Association, including any persons to hereafter become members, that if any member shall neglect, refuse or fail to market the whole of his milk,

[1] By-Laws, 1919, p. 12.

[2] *Ibid.*, p. 4.

cream, butter, cheese and other dairy products which he has to market or dispose of, through the facilities provided by the Association, that such member shall pay to the Association, as liquidated damages, and upon demand of the Association, the sum of fifteen (15) per cent of the value of the product sold by him otherwise than through the Association." [1]

Provision is made, however, whereby any member may withdraw his milk or other dairy products from the marketing arrangements, such withdrawal to take effect May 1 of any year, providing he gives written notice of his intent to withdraw at least thirty days before the annual meeting of the year in which such withdrawal is to take effect.[2] In case a member ceases to be a milk producer, provision is made for refunding to him the dues paid or such proportion of the dues as his proportionate share of the assets of the association amount to at the end of two years.

All expenses of maintaining the association are distributed over all the business done by the association for its members and charged against each member in proportion to the amount of business which the association has done for him.[3]

This whole group of California milk producers' associations has been federated into the Associated Dairymen of California, which was incorporated August 4, 1917, as a non-stock, non-profit organization, with five associations as its charter members.[4] At the close of 1919 this organization included approximately eight thousand dairymen, members of the following associations: [5]

[1] By-Laws, 1919, pp. 18–19.
[2] *Ibid.*, p. 19.
[4] *Ibid.*, p. 18.
[3] *Second Annual Report of State Market Director of California*, 1917, p. 24.
[5] *Fourth Annual Report of State Market Director of California*, 1920, p. 45.

Northern California Milk Producers' Association, Sacramento; Milk Producers' Association of Central California, Oakland; Associated Milk Producers, Inc., San Francisco; San Joaquin Valley Milk Producers' Association, Fresno; California Milk Producers' Association, Los Angeles; Imperial Valley Milk Producers' Association, El Centro; Salinas Valley Dairy Association, Soledad; Milk Producers' Association of San Diego, San Diego.

Membership in the central association consists of two representatives from each of the member organizations "duly accredited to represent and bind the association." [1] The members of the central association are "joint trustees for their respective milk producers' association," [2] and they hold any property rights which they acquire solely as trustees for the association which they represent. Each member pays a $100 membership fee upon entering. The vote of the members is equal at any meeting or on any subject. The members meet annually and elect a board of ten directors, who in turn elect the officers.

Each of the units retains its individual and corporate identity and continues to handle the production and manufacture of its own products and to care for such milk and sweet cream produced by its members as are marketed in those forms. "The products, such as butter, cheese, casein, sugar of milk, evaporated milk, condensed skim milk, powdered milk, and other dairy products will be marketed . . . through the medium of the Associated Dairymen of California." [3] The association has already appointed a market director, with the idea of getting the products more directly into the hands of consumers and

[1] Multigraphed By-Laws, p. 10.
[2] *Ibid.*, p. 13.
[3] *Third Annual Report of State Market Director of California*, 1918, p. 49.

of eliminating speculation. The association also proposes to investigate foreign markets and will establish branch offices in the eastern states of this country.

Provision is made that the district associations above named "may withdraw from the marketing arrangements, . . . such withdrawal to take effect on the first Monday of November of each year, provided such coöperative milk producers' association gives written notice of its intention in that regard . . . on or before July 1 of any year." [1] In case any district association fails to live up to its contract to sell all its manufactured product through the association, provision is made for liquidated damages to be paid by such defaulting association very much as was provided in the case of the Northern California Milk Producers' Association above.

Following are the principal milk producers' associations in operation at the present time, together with principal market centers:

Principal Milk Producers' Associations in the United States

Associated Dairymen of California	The State.
Northern California Milk Producers' Association	Sacramento, Cal.
Milk Producers' Association of Central Cal.	Oakland, Cal.
Associated Milk Producers', Inc.,	San Francisco, Cal.
San Joaquin Valley Milk Producers' Association	Fresno, Cal.
California Milk Producers' Association	Los Angeles, Cal.
Imperial Valley Milk Producers' Association	El Centro, Cal.
Salines Valley Dairy Association	Soledad, Cal.
Milk Producers' Association of San Diego	San Diego, Cal.
Colorado Milk Producers' Association	Denver, Colo.
Milk Producers' Coöperative Marketing Co	Chicago, Ill.
New England Milk Producers' Association	Boston, Mass.
Maryland State Dairymen's Association	Baltimore, Md.
Michigan Milk Producers' Association	Detroit, Mich.

[1] Multigraphed By-Laws, p. 12.

Twin Cities Milk Producers' Association.....Minneapolis & St. Paul, Minn.
Midwest Milk Producers' Coöperative Association..... Omaha, Neb.
The Dairymen's League.....New York City
The Dairymen's League Coöperative Association.....New York City
The Queen City Milk Producers' Association....Cincinnati, Ohio
The Ohio Farmers' Cooperative Milk Company..Cleveland, Ohio
The Oregon Dairymen's League.....Portland, Oregon
The Inland Empire Milk Producers' Association.Spokane, Washington
The Dairymen's Coöperative Sales Company...Pittsburgh, Pa.
The Inter-State Milk Producers' Association....Philadelphia, Pa.
The United Dairy Association of Washington....Seattle, Washington
The Milwaukee Milk Producers' Association.....Milwaukee, Wisconsin

Section 5. Coöperative Distribution of Milk

Although the movement toward coöperative milk distribution is in its infancy, it has been spreading rapidly of late. The writer has knowledge of the existence of twenty-six farmers' companies distributing milk at this time (May, 1920). The newness of this development is shown by the following table giving dates of organization of twenty-five of these companies:

TABLE XXXV

Year of Organization of Twenty-five Farmers' Milk Distributing Companies

Year	*Number organized*
1899	1
1906	1
1913	1
1916	3
1917	5
1918	5
1919	7
1920	2

FIG. 12.—Location of Twenty-six Farmers' Milk Distributing Companies in 1920.

These farmers' distributing companies are for the most part in smaller cities and have thus far not been handling large quantities of milk. Most of them distribute from 200 to 1,000 gallons of milk daily, while one runs as high as 4,000 gallons. In addition, of course, most of them handle some surplus milk. These companies are giving farmers an opportunity to get first hand information regarding the complex problems of the milk distributing business, and of the difficulties to be overcome if profits are to be realized.

The oldest of these companies is the Erie County Milk Association of Erie, Pennsylvania, which was organized in 1899. At that time there were eighty-five or ninety milkmen driving into the city to distribute their own milk. About 80 per cent of these joined in the formation of a company.[1] Each member subscribed for $3.00 worth of stock for each quart of milk supplied daily—in other words, a $50 share for every 16 2/3 quarts. The degree of success of the venture is indicated by the fact that although no stock has been issued in addition to the original $30,000, the market value in 1917 was $150,000.[2]

A considerable number of these companies were formed by groups of men who had been peddling their own milk, as was the case at Erie. Such coöperation in each case resulted in economies, not only in the handling of the milk at the central plant, but in its distribution. The economy resulting from coöperative distribution is indicated by the comparison in Table XXXVI on p. 186.

In some instances, as at Columbus, Ohio, where two companies are now in operation, farmers got together and formed these companies because they were dissatisfied

[1] *Milk Trade Journal*, Nov., 1917, p. 42.

[2] *Marketing Dairy Products*, Cir. No. 1, U. S. Bu. of Markets, Feb., 1920.

with conditions and prices, and because they felt that dealers were exacting too wide a margin.

TABLE XXXVI

Number of Drivers Required to Deliver Milk Before and After Formation of the Coöperative Companies

Location	*Before organization*	*After organization*
Erie, Pa.[1]	65	23
Du Bois, Pa.[2]	15	5
Greenville, Pa.[3]	10	4

Of twenty companies nine provide for a patronage dividend of some sort and eleven do not. Many of the companies depend to some extent on others than members to supply them with a part of their milk.

Some of these attempts on the part of farmers to distribute their own milk coöperatively have proved markedly successful. Others have resulted in partial or total failure, due to inadequate financing or lack of business skill and foresight. Several have had difficulties arising out of bad management and one has gone into bankruptcy within the past year because of dishonesty and mismanagement. One company, after operating profitably for about ten years, failed because of inadequate accounting and lack of intelligent supervision by the board of directors.[4]

It is doubtless too early to characterize the movement either as a success or a failure. Coöperative grain marketing is now generally considered successful, yet its begin-

[1] *Marketing Dairy Products*, Cir. No. 1, U. S. Bu. of Markets, Feb., 1920.
[2] *Weekly News Letter*, June 4, 1919, p. 16.
[3] *Ohio Farmer*, March 8, 1919, p. 382.
[4] *Marketing Dairy Products*, Cir. 1, U. S. Bu. of Markets, Feb., 1920.

ning was marked by many failures, and doubtless many of the existing grain companies will fail. In the fruit business, too, there have been many failures, yet coöperation is recognized as having done much for fruit growers. Likewise, there is doubtless much to be gained from co-operation on the part of dairymen, provided they do not, at the start at least, undertake ventures that are too big and too complex, and provided further, that they secure and adequately supervise the necessary business ability.

CHAPTER VI

MILK PRICES

Section 1. Price Relationships

PRICE is a matter of relationships of a bewilderingly complex nature. As an eastern editorial writer puts it, "the intricacy of price making in the New England markets is beyond the understanding of man." [1] Price is the resultant of the action and reaction of supply and demand and of the complex forces lying back of each. It is generally understood that a shortage in supply will bring about high prices and that a surplus will in the same way result in low prices. On the other hand, it is not so generally realized that a change in the demand will also influence price, which is but the focal point of the forces of supply and demand, and that price actually influences demand. Thus a decrease in the supply of milk usually means an increase in the price. But dealers are keenly aware of the fact that such an increase in price will most surely mean a decrease in consumption. A Toledo firm reports that in the summer of 1918 an increase in the price of from 13 to 15 cents, amounting to a 15 per cent increase, caused a decrease of consumption of 8 per cent. Other instances have been reported where such decreases have amounted to 10 or 20 per cent. The decrease in consumption of milk owing to an increase in price varies widely with such factors as wage increases, rise of other

[1] *New England Dairyman*, Apr., 1917, p. 6.

prices, attitude of competitors, attitude of public officials, attitude of the newspapers, and the state of public sentiment in general. For example, during the period of the war there were many instances in which increases in price of milk resulted in very little decrease in demand because some public body or the public in general had satisfied itself that the increase in price was justified, and that milk

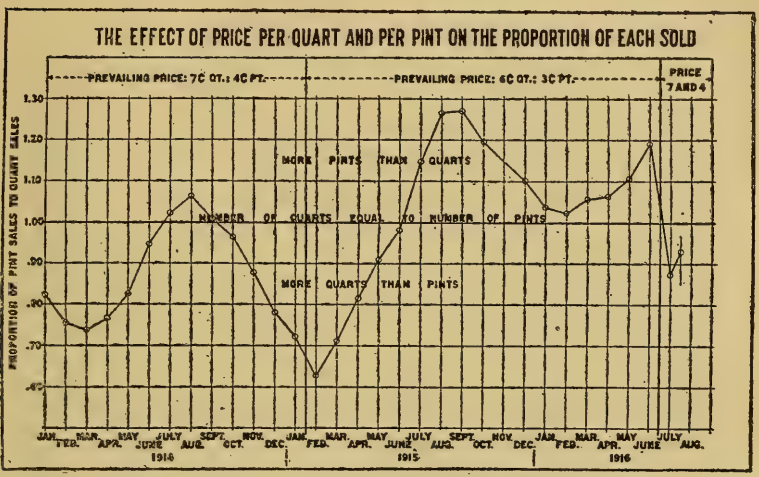
THE EFFECT OF PRICE PER QUART AND PER PINT ON THE PROPORTION OF EACH SOLD
PREVAILING PRICE: 7C QT.: 4C PT.
PREVAILING PRICE: 6C QT.: 3C PT.
PRICE 7 AND 4
MORE PINTS THAN QUARTS
NUMBER OF QUARTS EQUAL TO NUMBER OF PINTS
MORE QUARTS THAN PINTS
PROPORTION OF PINT SALES TO QUART SALES
1.30
1.20
1.10
1.00
.90
.80
.70
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG.
1914
1915
1916

FIG. 13.—Effect of Price per Quart and per Pint on the Proportions of Each Taken.[1]

was still a cheap food, since other prices had also been increasing. In other instances, however, it took a considerable amount of publicity to overcome the tendency to curtail consumption as price increased. The Chicago Health Department reported that in Chicago when milk was selling at 8 cents per quart, the daily consumption amounted to about one million quarts. When the price rose to 10 cents only about 800,000 quarts were consumed.

[1] From Wis. Agr. Exp. Sta. Bul. 285, p. 36.

An increase to 13 cents per quart reduced the consumption to about 584,000 quarts. This means, if the Department's estimates were correct, that Chicago consumers were actually paying out less for milk with the price at 13 cents than they had spent when the price was 8 cents per quart.[1] A similar experience was reported in Cleveland, where a leading dealer claimed to have lost more by raising the price from 9 to 10 cents per quart than he would have lost had it remained at 9 cents. In this case the demand did not come back to normal until the following spring. On the other hand, when prices are again lowered, it is often hard to bring consumption back to normal, because of the fact that milk consumption is so largely a matter of habit.[2] In Chicago, on the above mentioned occasion, consumption remained about 16 per cent below normal for some time after the price had been reduced to 12 cents.[3]

Just as an increase in the retail price will cause a falling off in the consumption, so an increase in the price paid to producers usually means an increased supply, unless counteracting forces are also at work, such, for example, as increases in costs or better opportunities along other lines. When prices are unusually good, producers are encouraged to increase supply. This they can do in sev-

[1] Duncan, C. S., *Jour. Pol. Econ.*, Apr., 1918, p. 333.

[2] This at first thought appears to be a case where a rule did not work both ways. That is, whereas an increase in the price of milk caused a decrease in the demand, a decrease in the price did not in the same degree cause an increase in consumption. What had probably happened was that milk prices had become customary. Then when these customary prices were disturbed in a way unfavorable to consumers, the latter became resentful, especially where their sense of injury was fanned by public statements and press dispatches. On the other hand, once a lower standard of consumption had become habitual, a fall in price did not of itself at once jar people out of the new habits, and hence the demand did not respond quickly to price cuts.

[3] Davenport, E., *Hoard's Dairyman*, Mar. 1, 1918, p. 234.

eral ways. Each farmer, for example, feeds his cows a little more grain. He may house them a little more comfortably—keep them in on cold days, etc. He feeds less milk to calves and pigs. He may even curtail consumption of milk in his home; perhaps he buys oleomargarine, for example, so as not to have to skim any of his milk in order to provide butter for the family. Finally, he may keep his cows longer, *i. e.*, each farmer, instead of turning off some of the older cows, as he usually does, and replacing them with heifers, may milk both the old cows and the heifers, thus increasing the size of the herd. All of these influences would become operative with an attractive increase in price, some of them quickly, others more slowly. With a decline in price the reverse operation would take place. In addition to the above changes, of course, an increase in price in a given market will attract milk from other markets, whereas a general increase in the price of milk will attract milk from other uses. This last point is an important one, particularly in such sections as the milk sheds of New York, Milwaukee, or Toledo, where so large a proportion of the milk is manufactured into the various milk products.

There has been much said during the past few years regarding the relation between cost and price. The idea has often been advanced that price should equal cost plus a "reasonable profit." Much of the discussion has been by people who assumed that there is a definite figure representing *the cost* of producing milk in general, as though all milk of market grade cost the same amount. This, of course, is untrue, for costs vary about as widely as do men and cows and the conditions under which they live.

Again it has been suggested that price should equal *average* cost plus a "reasonable profit." But to average

the various costs would at once leave half of the producers "out in the cold," since half of them would be producing at a cost higher than the average and would be compelled to quit the business if prices were established at that figure.

It is often said that over a considerable period of time the price of a commodity will tend to equal its marginal cost of production, *i. e.*, the cost of the most expensive portion of the supply. This is undoubtedly true. But to say that price tends to *equal* marginal cost is not necessarily to say that marginal cost tends to *determine* price. Price itself may have much to do with the determination of this marginal cost, since any producers having higher costs will be eliminated because consumers are unwilling to pay a price sufficient to keep them in the game. In other words, we are not sure as to which blade of the shears is doing the cutting.[1]

Suppose, for example, that producers A, B, C, D, and E are producing milk at costs of $3.00, $2.90, $2.80, $2.70, and $2.60 per hundredweight respectively. With the price at $3.00 A is just able to continue production, and the others make some profit. Farmers X, Y, and Z, let us suppose, have tried to produce and have found that their costs were $3.30, $3.20, and $3.10 respectively. Being unable to produce cheaply enough, they have dropped out. A's cost is, therefore, the marginal cost but can hardly be said to have *determined* price. A decrease in demand might have made B's cost the marginal one. In the long run price must, of course, cover cost of production of the most expensive portion of the total product which society is willing to continue to purchase.

It is incorrect, however, to think that the most expen-

[1] See Alfred Marshall, *Principles of Economics*, Sixth Ed., p. 348.

sive portion of the product is necessarily the marginal product in the sense that it will be the first to be withdrawn in case price falls. It may be, and indeed often is a more cheaply produced portion of the supply which is withdrawn when price falls, because what we may call the real cost of production often includes an "opportunity cost," that is, the sacrifice of an opportunity to do nearly as well at some other line of production. Then when the milk price falls slightly, this alternative line becomes the more attractive and causes the producer to change, even though his actual money and labor costs are not the highest. We must, therefore, think of the marginal producer not as the man who produces at the highest cost, but as the *man who is just barely induced to continue to supply the product*. This definition obviously will include both the man who is producing at a high cost and the man who has a high opportunity cost. An example will make this clear:

Suppose that with the price of milk at $3.00 per hundredweight farmer A just succeeds in making a living and paying all necessary expenses. He is a marginal producer in either of the above senses. Farmer E, however, may be producing milk at an expense of but $1.60 per hundredweight, which leaves him a profit of $1.40 per hundredweight, and still be as truly a marginal milk producer as A in the sense that any reduction in the milk price may induce him to cease producing because he can make more at some other line of farming. The withdrawal of E's supply of milk would as surely create a shortage as would the withdrawal of A's supply; yet one produces at a cost of $1.60 and the other at a cost of $3.00, and both would withdraw from production if the price fell to $2.90. Indeed E might withdraw first, because he is a more capable

farmer and therefore not only more quickly sees opportunity for gain in some other line, but can more readily rearrange his operations so as to take advantage of this alternative opportunity.

Men who urge for farmers prices that will insure "cost of production plus a reasonable profit" overlook the fact that even if milk were 15 cents a quart and wheat $7.00 a bushel some men would still be producing at a loss because new and less efficient men are always attempting to enter any business which promises profit, and because older producers may temporarily become less efficient. Thus there would quite certainly continue to be "marginal producers" in both the above senses, *even at those high prices.*

Section 2. Determination of Wholesale Milk Prices

By wholesale prices we here mean the prices paid to producers at country or city points receiving milk directly from producers. These wholesale prices and their determination are of particular interest to us because it is at that stage that price levels of milk are really determined. It is there that all the complex forces of supply and demand focus. Increased or decreased production is there quickly observed, and changes in demand for milk for any of its many uses are also quickly reflected. In general, the use to which a particular lot of milk is to be put must be decided upon within a few hours after it has been delivered at a receiving plant. True, condensed and powdered milks have many uses, and decision as to the particular use need not be made for months or years. But in the case of milk as it comes from the farm the perishability is so great that within a very short time after it is delivered at the plant definite decision must be made as to how

much, if any, is to be used in butter manufacture, how much for cheese, how much for fluid consumption, how much for condensing, etc. Many plants, of course, make butter only; others make cheese only. Many, however, are so equipped that they can earily change from one line of production to another according as one or the other is more profitable. In the aggregate the number of plants which can thus change from one line to another is sufficiently large to keep a fairly close balance between the various use-demands, and these use-demands focus on the various receiving points.

The individuals who are engaged as producers and dealers have very real problems to face in trying to arrive at prices. For wheat and corn there are well regulated market places or exchanges at which the various forces back of supply and demand can register at intervals of minutes or even seconds. Changes are here registered in cents and eighths of a cent and these changes flashed to various parts of the world by telegraph and telephone.

Similar mechanisms facilitate the determination of market prices of many other basic commodities, such as cotton, silk, coffee, sugar, and, to a lesser extent, butter and cheese. For milk, however, no such mechanism has been developed. Consequently, when adjustments of price are made at more or less regular intervals, the fluctuations are more violent and the proper point of equilibrium is more difficult to ascertain. Furthermore, price adjustments are usually made for periods of a month or more in advance—a fact which further complicates the problem. One of our leading market journals some time ago proposed the idea of an open call for milk in our large cities "where surplus or shortage in supply would quickly

be reflected." [1] Though such a call market would not establish prices which would be suitable for milk contracts with producers, the editor of the journal held that it would "perform a useful function in keeping the trade, the producer, and the consumer advised as to the condition of the market" and would also "reflect a proper balance between prices ruling on market milk and on manufactured dairy products." [2] At the present time, however, so far as the large dealer and the representative of the producers' organizations are concerned, the problem of price determination is not one of theory or of "glittering generalities," but is a matter of arriving at an actual figure expressed in dollars and cents. We are therefore particularly interested in the various methods used in arriving at the prices.

In many instances the determination of the proper price has fallen altogether upon the dealers and more especially upon the large dealers. The dealer, after looking about him and deciding what he could get for the milk on the one hand and what price would bring forth the necessary supply on the other hand, has announced his price to the producers. This has very often taken the form of announcing to the patrons of a country or city plant that on a certain day the books would be open to receive signatures to milk contracts for the ensuing contract period and that the books would be closed on a certain date. This method of posting price has generally amounted to a fixing of the price by the dealer, since an unorganized body of farmers would be likely to sign up, even though the price seemed ridiculously low, particu-

[1] *New York Produce Review & American Creamery*, Oct. 17, 1917, p. 994.
[2] *Ibid.*

larly if it were feared that the company might not be willing to take all the milk offered.

In sections where small and large dealers operate side by side, the price has usually been named by the larger dealer. The smaller dealers watch the larger ones and pay approximately the same prices.[1] The larger dealer is able to gage more accurately the conditions of supply and demand than can the small dealer. He is not as free, however, to fix a price which suits him as is commonly supposed. Assume, for example, that he buys milk at too low a price. Some farmers are quite certain to curtail their production or divert their milk to other channels, and he will find himself confronted with a shortage of milk. Hence he will have to pay more. On the other hand, suppose he buys milk at too high a price; he will very soon find himself with too large a supply on hand, and unless he takes all milk offered at this high figure, competitors will be able to buy milk at a lower price, which will enable them to cut under his selling price. Small dealers in particular are wont to cut prices at every opportunity. Hence, if they were able to buy more cheaply, they would quite certainly undersell the large dealer. The result is that the large dealers learn to come very close to a proper decision as to what price will bring supply and demand to an equilibrium. The fact that the smaller dealers usually follow closely the prices offered by the larger dealer often gives the appearance of combination, and such coincidence or tacit agreement has on numerous occasions been made the basis for grand jury investigations.

The practice on the part of the dealers of posting a price and trying to rush farmers into signing the contract

[1] Duncan, C. S., *Jour. of Pol. Econ.*, Apr., 1918, p. 344.

has in many instances led to revolt on the part of the farmers, who have organized for the purpose of fixing prices themselves. This was the prime object of most of the earlier associations.

More recently, however, each side has come to recognize that the other side may justly have something to say. As a result there has more often been some sort of collective bargaining, such as has already been described.[1] In connection with such collective bargaining, however, there is usually lacking a tangible basis by which the two sides can arrive at the same figure. Cost of production and market prices of certain milk products have both been advocated as automatic price determinants. Most frequently suggested, especially during the past few years, has been cost of production. Although this determinant had earlier received considerable attention, often in attempts to show that the producers were getting too low a price for their milk, there had been little or no serious attempt to bring about the use of such cost as a basis for prices until after our entrance into the war. At that time price-fixing came into vogue, and the most natural basis for fixing prices was cost of production. Producers who had been firmly convinced that they were getting too low a price eagerly grasped at cost of production as the proper basis for price determination.

It is not, however, a satisfactory basis. In the first place, cost of production varies from time to time, from farm to farm, and from producer to producer. To average these costs, as is often suggested, would not do, since, as already pointed out, one-half of the producers would at once find themselves selling milk at a loss and would stop producing. Then again, cost and demand vary independ-

[1] See Chap. V, Sec. 4.

ently and often inversely. For example, it may, and indeed often does happen, that at certain times cost of production rises because of failing pastures and increases in the cost of feed, while at the same time the demand falls off. In fact, whereas demand is fairly constant throughout the year, cost of production varies largely in a seasonal way. (See Figures 7 and 9.) Furthermore, even in specific instances, actual cost of production is extremely difficult to ascertain because of joint costs. It is not the cost of a given product, but the joint costs and profits of a complementary set of enterprises that the farmer considers or should consider in deciding whether or not to produce milk.[1]

Cost of production, however, can be useful to dairymen in the matter of price determination. In the first place, properly determined costs show the individual producers whether they can as individuals continue to sell milk at prevailing prices. In the second place, an accurate knowledge of costs is a convenient basis from which to start in collective bargaining. It gives a strong leverage for a minimum price high enough to include most of the producers and may forestall public criticism or court proceedings. In case there is a question of fixing prices, as in war time, a knowledge of costs is exceedingly valuable. Its value here, however, may be overemphasized. Its principal service in this connection would seem to be in safeguarding a necessary industry in case of temporary depressions or in safeguarding the public when there is a temporary shortage with its attending high prices. In such cases a study of the range in costs would enable whatever public body had the matter in hand to establish prices at such points as would cover costs of most of the

[1] Taylor, H. C., *Agr. Econ.*, Chap. XXVIII.

producers. This is the "bulk line" [1] idea of establishing the price at such a point as will cover the cost of producing the great bulk of the commodity coming to the market. Even here, however, a study of costs alone would not necessarily keep sufficient supplies coming to the market, as the above analysis of the normal relation between cost and price shows.

Largely as a result of the attempt to use cost of production as a basis for a determination of milk prices, there came into prominence, early in 1918, what is known as the formula method. The Chicago Milk Commission had been in session for several months during the close of 1917 and the beginning of 1918, attempting to determine a fair price for milk in the Chicago district. After taking nearly six thousand pages of testimony the Commission was really more at sea than when the inquiry started. Costs varying from $2.05 to $12.00 per hundredweight were shown by the producers.[2] This variation alone showed, in the opinion of the Commission, "the impossibility of determining cost of production from such evidence." In addition there were all sorts of conflicting opinions expressed as to proper methods of charging feeds,—whether, for example, feeds were to be charged at cost of production or at market price. As a last resort the Commission adopted the formula method, which had been proposed by *Hoard's Dairyman* some time earlier.[3]

The formula plan was based upon the assumption that the relative quantities of the different elements going to

[1] See *Price Fixing by a Price Fixer*, F. W. Taussig in *Quar. Jour. of Econ.*, Vol. XXXIII, Feb., 1919, p. 219.

[2] Report of Commission, *Milk News*, Feb., 1918, p. 1.

[3] *Hoard's Dairyman*, Dec. 14, 1917, p. 732.

make up the total feed and other costs of milk production remained constant in a given district, only the values of the different items changing from time to time. The formula adopted was based on a study, covering a period from 1908 to 1915, inclusive, of 36 Illinois farms, including 873 cows.[1] This study showed the following average costs of producing 100 pounds of 3.5 per cent milk in terms of feed and labor:

22 pounds home-grown grain
22 pounds purchased grain
50 pounds hay
188 pounds silage
39 pounds forage
2.42 hours labor

These were subsequently rearranged into four groups, as shown below.

Knowing the quantity of each of the various items entering on the average into the production of 100 pounds of milk, and having ascertained the average price of each, as well as the average price farmers received for their milk during the basic eight-year period, the Commission proceeded to determine what should be the current value of milk at the new feed and labor value. It was assumed that prices of milk had been sufficient to cover costs and a profit during this basic period, for "it would appear from the testimony that the dairy industry in the Chicago District had been a reasonably successful industry during a normal period of eight years preceding the war period. Lands had increased in value—improvements had occurred. The financial worth of those engaged in the industry had materially improved. That profits had not

[1] *Hoard's Dairyman*, Mar. 1, 1918, p. 238.

been excessive is indicated by the normal increase in supply to fill the demand. Because of the nature of the industry, had profits been excessive, an over-supply would have followed; had they been unsatisfactory, a shortage would have been the result." [1]

It was found that the relative weight of each of the four groups of items based on average values during the eight-year basic period was as follows:

Relative weight	*Item*
19.....	Home-grown grains
19.....	Mill feeds (wheat, bran, wheat middlings, hominy, cotton seed meal, oil meal, gluten feed, dry salt)
35.....	Hay (including silage valued at the ratio of 3 tons of silage to 1 ton of hay)
27.....	Labor
100	

Variations in the prices of these four units were agreed to "represent with sufficient accuracy, when applied, according to the above ratio, the increase or decrease in the cost of production of milk." [2] It was found that in November, 1917, corn, representing home-grown feeds, had increased in price 179 per cent over the basic period; mill feeds had increased 81.8 per cent; hay 40 per cent, and labor 50 per cent. Applying these percentages to the old percentages the Commission got as a new index the following:

[1] *Milk News*, Feb., 1918, p. 1.
[2] *Ibid.*, p. 2, Report of Commission.

	Basic Index	*New Index*
Corn	19	53.01
Mill feeds	19	34.41
Hay	35	49.00
Labor	27	40.50
Total	100	177

The average November price of milk during the eight-year period had been $1.768 per hundredweight. Multiplying this figure by 1.77 gave $3.13, the proposed price for November milk. In the same way prices of milk for succeeding months were determined by multiplying the eight-year average price for the respective months by 1.77.

Three of the nine members of the Commission, however, refused to sign the report and issued a minority report dissenting from the opinion of the other six members and characterizing the findings as unfair to the producers. The producers, in fact, were so incensed over the final findings that very many of them refused to send milk at the established prices.[1] The dissatisfaction arose out of the application of the formula rather than out of the scheme itself. Dean Eugene Davenport, of the University of Illinois, in fact, resigned from the Commission, but stated in his letter of resignation that he approved of the formula, which he thought would "with very great accuracy" express the rise and fall in feed and labor costs "if properly used upon an adequate base." [2] The latter point, he felt, had not been observed, since the basic period was one of decided unrest among the producers, as was evidenced by the rise during that period of the Milk Pro-

[1] *Hoard's Dairyman*, Feb. 15, 1918, p. 148.
[2] *Ibid.*, Mar. 1, 1918, p. 238.

ducers' Association, an organization built up to overcome adverse price conditions.

The formula was, however, adopted as a base of price determination on March 1, but only after considerable modification. This modification consisted mainly in bringing up to date the figure 177, representing the percentage of increase over the basic period, thus making it 181 for March, so that the producers got in March $3.10 instead of $2.83, as first awarded. Succeeding months were then to be based on further changes in the prices of the various items.[1] The formula method was then actually used for a number of months, when it was further revised, this time in such a way that the current values of the commodity costs of producing 100 pounds of milk should directly equal the value of 100 pounds of milk. These commodity cost items were to be:

20 pounds home-grown grains
24 pounds manufactured feeds
110 pounds hay
3 hours labor

After ascertaining the current values of these items from the Department of Agriculture reports and from current market journals,[2] the total value of these quantities was to be considered the value of the milk. In order to allow for seasonal variations in the prices of milk, the following percentage scale was to be applied to the basic price to determine the actual price for the month under consideration.[3]

[1] Duncan, C. S., *Jour. of Pol. Econ.*, Apr., 1918, p. 314.

[2] See *Milk News*, July and August, 1918, p. 2, for detailed method of determining these values.

[3] *Ibid.*

	Per cent
January	117
February	112
March	105
April	95
May	80
June	70
July	85
August	95
September	100
October	107
November	115
December	119

As thus revised, the plan was used as a price determinant for a number of months. At the present time it is used chiefly as a starting point or basis for collective bargaining.

Similar methods of arriving at milk prices were tried in a number of sections, particularly in New York City, where the so-called Warren Formula was used. The milk boycott of January, 1919, was a direct result of the attempt on the part of the Dairymen's League to use this formula. At the present time this method has practically been abandoned as a direct price determinant. The main reasons for its failure seem to have been the following: (1) Prices and costs do not coincide at given times and places, even though on the average there is a relatively close relationship between seasonal costs and prices of milk;[1] (2) as prices of the various items of cost entering into milk production change, farmers are likely to change the proportions used, thus vitiating the formula; (3) other changes may have occurred at the same time costs were

[1] See Figure 9.

changing, thus making other types of farming so much more profitable that farmers would not be satisfied with the same rate of profit as prevailed in the basic period.

The formula method should, however, be a valuable guide in price determination in connection with collective bargaining, particularly if its basic elements are kept up to date, so that the formula will accurately show current changes in major costs from time to time.

Another proposal that has been made for price determination by a ready method is to take prices of certain regularly quoted commodities, like butter, cheese, or butter and corn as a basis. It should be pointed out, however, that butter is, to a large extent, produced in sections where grain growing is the main enterprise and that butter and most other milk products can be stored for long periods, and hence their prices would tend to be more uniform as between seasons of shortage and surplus than are milk prices.

In the Minneapolis-St. Paul market during the year 1919 and well into 1920, the cheese market has been the basis of prices, but, owing to the unnatural behavior of cheese prices in 1919, this basis has proven unsatisfactory and will either be given up or revised. The plan is thus described by one of the officers of the Twin City Milk Producers' Association: [1]

"In the fall of 1918 we began to base our price of milk on the Plymouth, Wisconsin, cheese market. We averaged the quotations of Twin Cheese on the Plymouth market each month, multiplied them by 10, assumed a 10 pound yield of cheese per 100 pounds, and added a differential of 70 cents per hundred pounds, to cover the cost of transportation to the dealers' plants, and the value of the whey.

[1] Letter to the writer, Mar. 29, 1920.

"Beginning August 1, 1919, we used and are still using a sliding differential, varying from 40 to 60 cents per hundred pounds, in order to make some allowance for the variation in supply. During the past few months, on account of the cheese price being so much lower than butter, we have not been at all satisfied with our present price basis. When our present contracts expire July 31, we hope to base our price either on butter or cheese, with a sufficient differential added to make a price somewhere near the cost of production."

In the New York City district, beginning April, 1919, a similar plan was tried, but seems to have proved inadequate. In the spring of 1920, when milk prices fell out of line with prices of butter and cheese, the milk dealers refused to continue to use the plan.[1] The producers rejected a plan proposed by the dealers, and there the matter stands (June, 1920). It is likely, however, that some modification of the method will be used in the future. The basis was the New York butter and cheese prices.[2] The butter price taken was the average of daily prices of 92 score butter on the New York market for one month. Allowing for 4.176 pounds of butter in 100 pounds of milk (3.6 per cent milk at 16 per cent overrun), the butter value of milk could be calculated. Thus the January, 1920, price of milk was computed on December 20 by averaging butter prices from November 20 to December 19, which gave an average butter price of $0.732 per pound, making $3.06 for 100 pounds of milk. Adding $1.16 as the value of skim milk per 100 pounds of whole milk gave a value of $4.22 as the total butter and skim milk value for Jan-

[1] *Dairymen's League News*, Mar. 25, 1920, p. 1.

[2] *Milk Reporter*, Jan., 1920, for detailed methods of calculation and price schedules.

uary. A table was prepared (Schedule "A") to show the value of butter, of skim milk, and of whole milk based on different butter and skim milk prices. This table assigned to the skim milk in one hundredweight of whole milk values varying from 20 cents, when butter was 25 cents per pound, to $1.30, when butter was 80 cents per pound.

The average cheese price for the same period was $0.3191 Allowing for 9.68 pounds of cheese to be made from 100 pounds of 3.6 per cent milk, and adding for the value of whey in 100 pounds of whole milk approximately 22 cents, a total of $3.31 was secured as the cheese basis value. The values assigned to whey varied from 10 cents for the whey in 100 pounds of whole milk, when the cheese price was 10 cents per pound, to 25 cents, when cheese was 37 cents per pound. The butter price of $4.22 and the cheese price of $3.31 were averaged, giving a butter-and-cheese price for milk of $3.77 for 3.6 per cent milk. To this was added an arbitrary differential of 16 cents for the month of January, making the price of milk $3.93 in the 200–210 mile freight zone. Differentials for the various months, were: [1]

January plus	16 cents
February plus	16 cents
March plus	16 cents
April minus	15 cents
May minus	15 cents
June minus	15 cents
July plus	16 cents
August plus	36 cents
September plus	36 cents
October plus	26 cents
November plus	26 cents
December plus	26 cents

[1] *Milk Reporter*, Jan., 1920.

Table XXXVII brings out the usual relationship between prices of butter, cheese, and milk, as well as milk prices based on butter and corn prices. Column 3 in Table XXXVII shows the percentage monthly variation in milk prices in Chicago, 1908–1915. In columns 1 and 2 are butter and cheese prices for the same period.

TABLE XXXVII

Relative Monthly Prices of Butter, Cheese, and Milk Based on Chicago Market, 1908–1915, and of Milk Based on Butter and Corn Prices[1]

	Butter	*Cheese*	*Chicago whole milk*	*Butter & corn*
January	109.7	103.6	118.3	104.9
February	103.5	106.7	114.4	101.0
March	102.2	106.7	106.5	100.2
April	98.9	100.7	93.5	98.7
May	91.0	94.0	77.1	93.2
June	90.3	93.0	69.9	94.0
July	89.6	93.7	83.0	94.0
August	91.0	97.5	94.7	95.6
September	96.8	98.3	97.4	101.0
October	101.1	99.5	107.1	102.3
November	109.0	101.1	115.7	104.9
December	116.1	103.6	118.3	109.5
Average	100	100	100	100

It will be noticed that whereas milk varied from a low of 69.9 to a high of 118.3, butter varied from only 89.6 to 116.1, and cheese from 93 to 106.7. To tabulate more concisely, we get the following comparison:

Cheese Low....93.0	High.....106.7	Difference....13.7
Butter Low....89.6	High.....116.1	Difference....26.5
Milk Low.....69.9	High.....118.3	Difference....48.4

[1] Pearson, F. A. *Farm Econ. Jour.*, Oct., 1919, p. 94.

The main difficulty, however, is not to be found in the fact that the fluctuations occur at different rates, for these could be counterbalanced by the use of differentials for each of the various months, much as the Dairymen's League has worked our differentials in connection with its attempt to use the butter-cheese basis. The real difficulty would come from the fact that butter and cheese prices so often fluctuate more or less independently and at certain times may be considerably at variance with their usual position relative to milk. Note for example irregularities shown in the chart comparing New York milk and New York butter extras for a period of twenty years. (Figure 14.) The chart represents relative prices, and hence milk and butter are directly comparable. It will be noticed that milk almost invariably goes higher in winter and lower in summer than butter and that it does so in such an irregular manner that it is extremely doubtful whether this basis would be satisfactory to both producers and dealers for any length of time, even in normal times. Notice particularly for some of these irregularities the winters of 1907 and 1908, 1910 and 1911, and the winter and spring of 1912–13.

Another proposal, brought forward in the condensery district of Wisconsin, is that of basing milk prices on prices of butter and corn. According to this plan, the butterfat in milk is to be paid for on the basis of butter prices, while an allowance is to be made for the skim milk in 100 pounds of milk on the basis of its feeding value as compared with corn. Column 4 in Table XXXVII gives the monthly variation in milk prices based on prices of butter and corn. One hundred pounds of milk is to be considered worth the number of pounds of butterfat in the milk times the Chicago market price of 92 score butter,

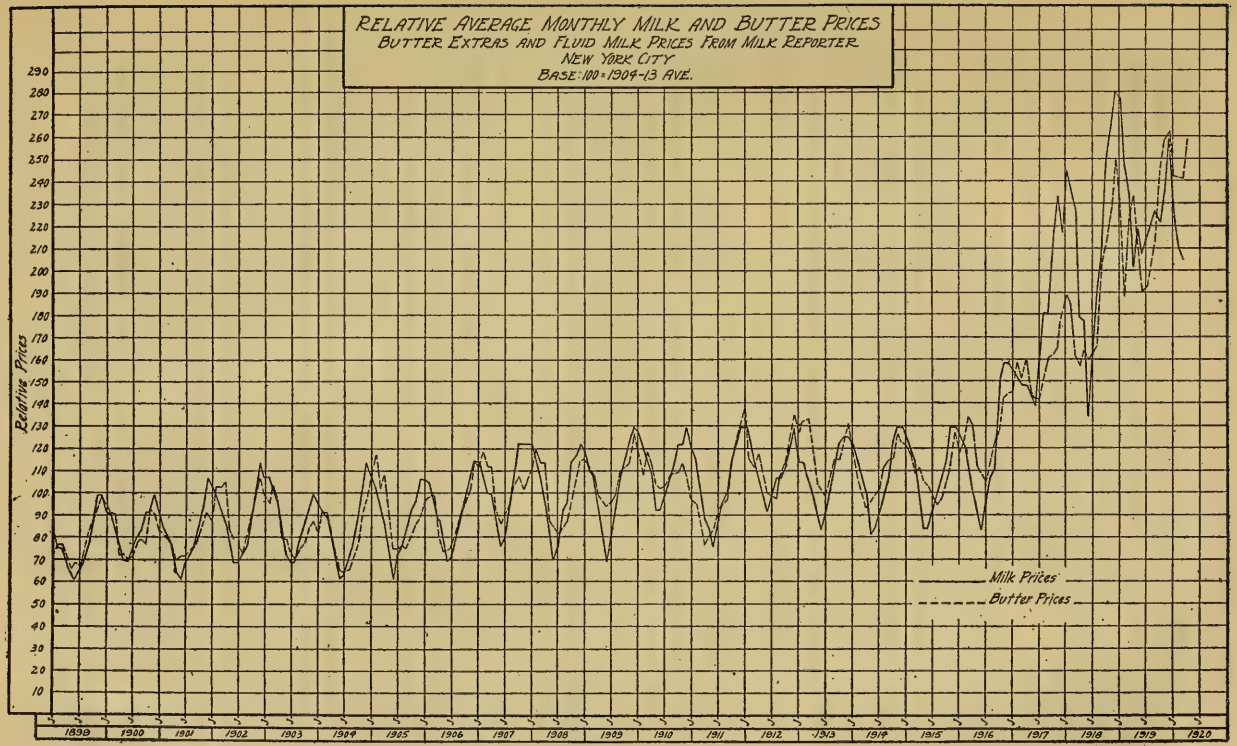

FIG. 14.—Relative Average Monthly Milk and Butter Prices, New York City, 1899 to 1920.

plus a differential of 6 cents for fat over butter, to which is added the value of 85 pounds of skim milk. The latter is to be determined on the basis that 100 pounds of skim milk should be equivalent to one-half the price of a bushel of corn.[1]

A somewhat similar plan has been in use for a number of years by an Ohio company which sells large quantities of sweet cream in a wholesale way to ice-cream manufacturers, milk dealers, and others. This company has paid for the butterfat a price based upon, and usually several cents above, Chicago butter extras. An additional price is then paid for the skim milk in 100 pounds of whole milk.

On the whole it is doubtful whether any ready method can be found for arriving at prices in our large market centers at any given time by any simple formula or basic commodity-price method. All of these methods, however, may be very useful at times as aids in arriving at prices for current months.

Figures 15 to 29 show the movement of milk prices paid to producers in various parts of the United States from 1913 to 1919, inclusive. The prices upon which the curves are based are not in all cases comparable, since they often represent different things. (See also Chap. II, Sec. 7.) The Springfield, Ohio, Columbus, Ohio, and Pittsburg prices are for 4 per cent milk, whereas the others are for milk varying from 3.5 to 3.7 per cent. The Cleveland, Toledo, New York, and Pittsburg prices are country prices, whereas the Springfield, Columbus, Philadelphia, San Francisco, Chicago, and New Orleans prices are city prices. We are here interested mainly, though not wholly, in price movements during the period under consideration.

[1] F. A. Pearson, *Jour. of Farm Econ.*, Oct., 1919, p. 93.

Eleven cities are compared with the average of ten of the leading cities. These ten are Milwaukee, Chicago, New Orleans, Pittsburg, Philadelphia, San Francisco, Detroit, Baltimore, New York, and Cleveland.

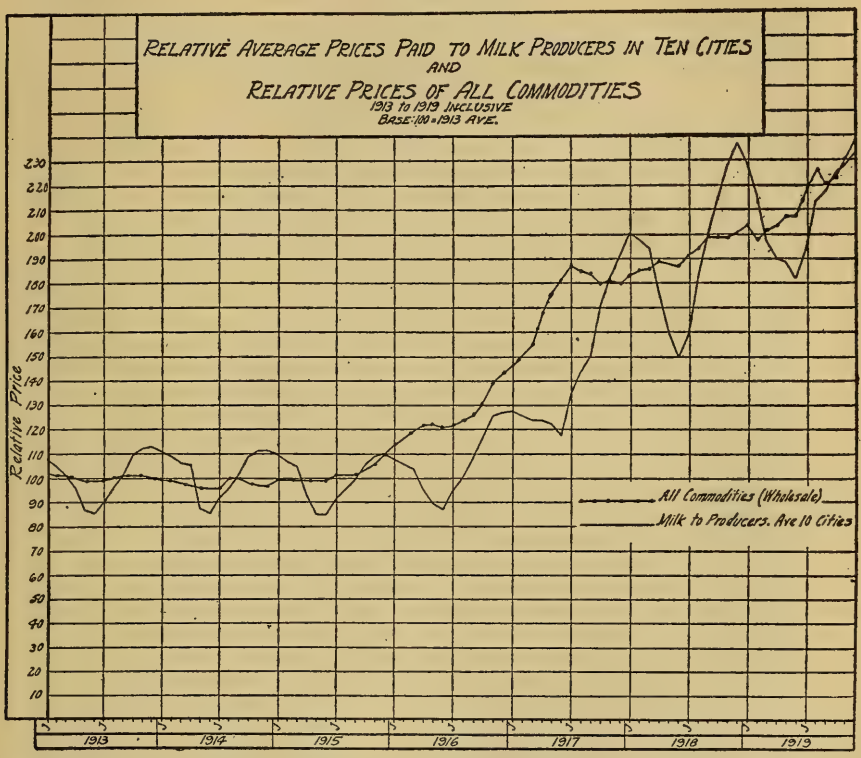

FIG. 15.—Relative Average Prices Paid to Milk Producers in Ten Cities, and Relative Prices of "All Commodities."

In several instances during the early part of the period the prices seem to have changed only two or three times during the year. This seems to have been particularly true in New Orleans, Philadelphia, San Francisco, Springfield, Ohio, and Columbus, Ohio.

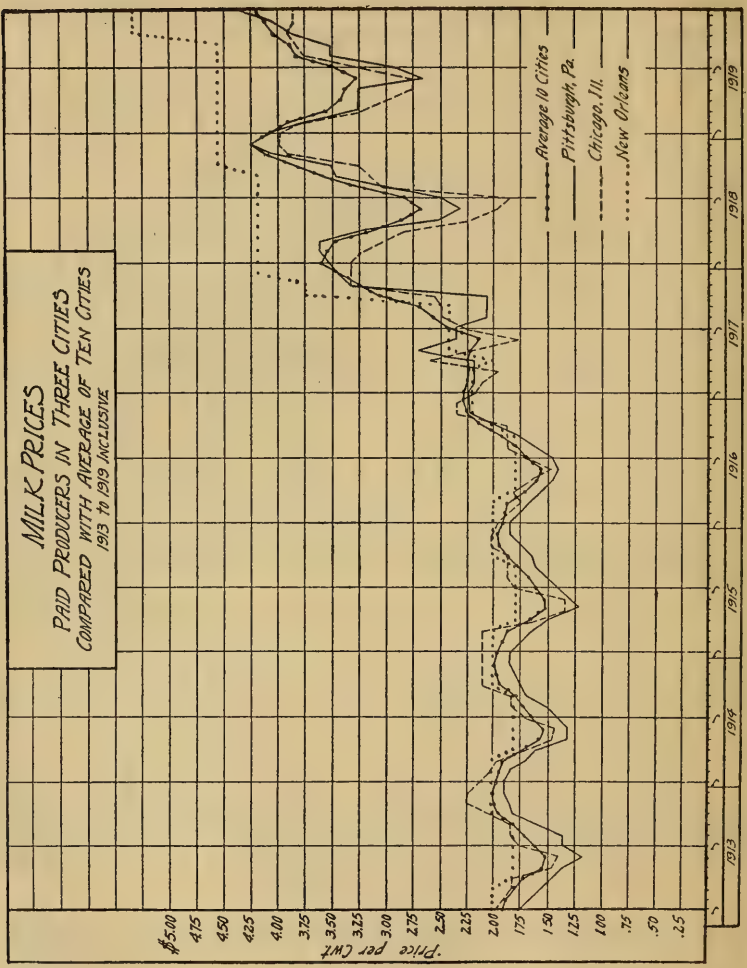

FIG. 16.—Milk Prices Paid Producers in Three Cities (Pittsburgh, Chicago, and New Orleans). Compared with Average of Ten Cities.

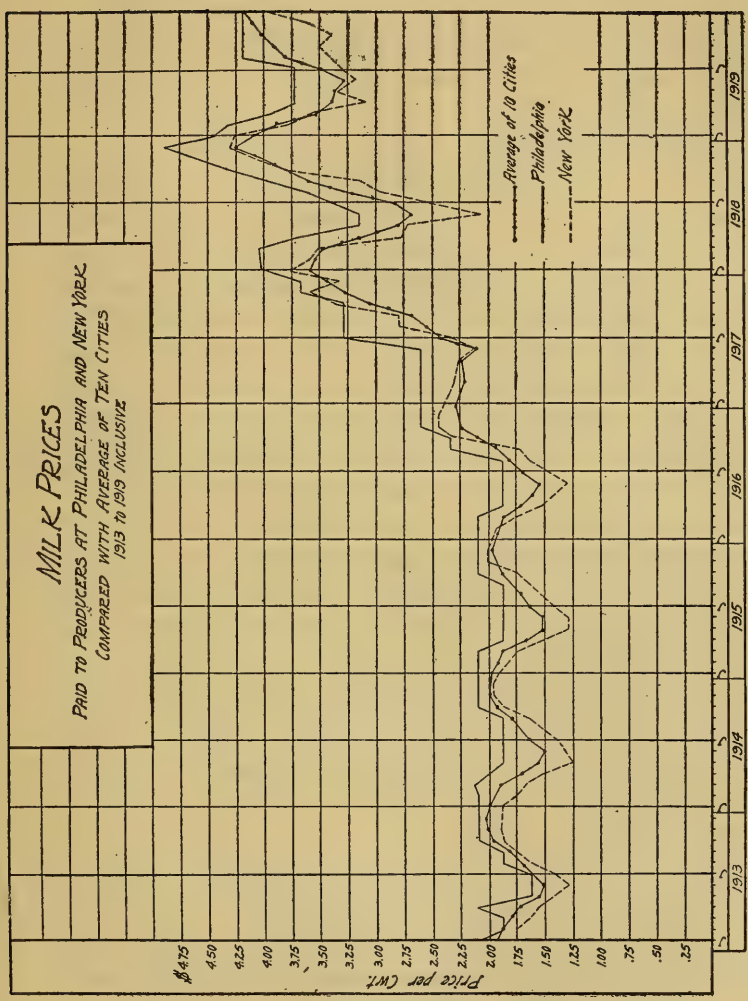

FIG. 17.—Milk Prices Paid to Producers at Philadelphia and New York Compared with Average of Ten Cities.

Figure 15, comparing prices of milk in the ten cities with the "all commodities" index of the War Industries Board,[1] shows that milk prices lagged behind other prices from the middle of 1915 to near the end of 1917, and in fact even during 1918 and 1919 they were not quite up to the level of other prices.

Figure 16 compares the price in Pittsburg, Chicago, and New Orleans with the ten cities average. Pittsburg and New Orleans show somewhat greater gains than does Chicago. In Figure 17 Philadelphia apparently maintains its position relative to the average rather steadily. During the early years of the period the seasonal fluctuations were not nearly so violent as were those of most of the cities. During the early war period of 1917 the Philadelphia price was considerably above that of the ten cities. The New York prices rose somewhat more rapidly than the average during 1916 and 1917.

Figure 18 compares Toledo and Cleveland with the ten cities average. It is interesting to note the fluctuations in the Toledo curve. Toledo is a condensery center, and this fact is reflected in the high prices paid during most of 1917, when the price at times went above the ten cities average, although normally it was below. Again, in the spring of 1918, the Toledo price slumped badly, since at this time condensery markets were poor owing to curtailment of exports.

Figure 19 compares Springfield and Columbus, Ohio, with the ten cities average. During the last half of the seven years Springfield prices have perhaps approached somewhat the ten cities average, whereas Columbus prices have, if anything, fallen slightly below the ten cities average.

[1] Bureau of Labor Statistics figures for 1919 were used.

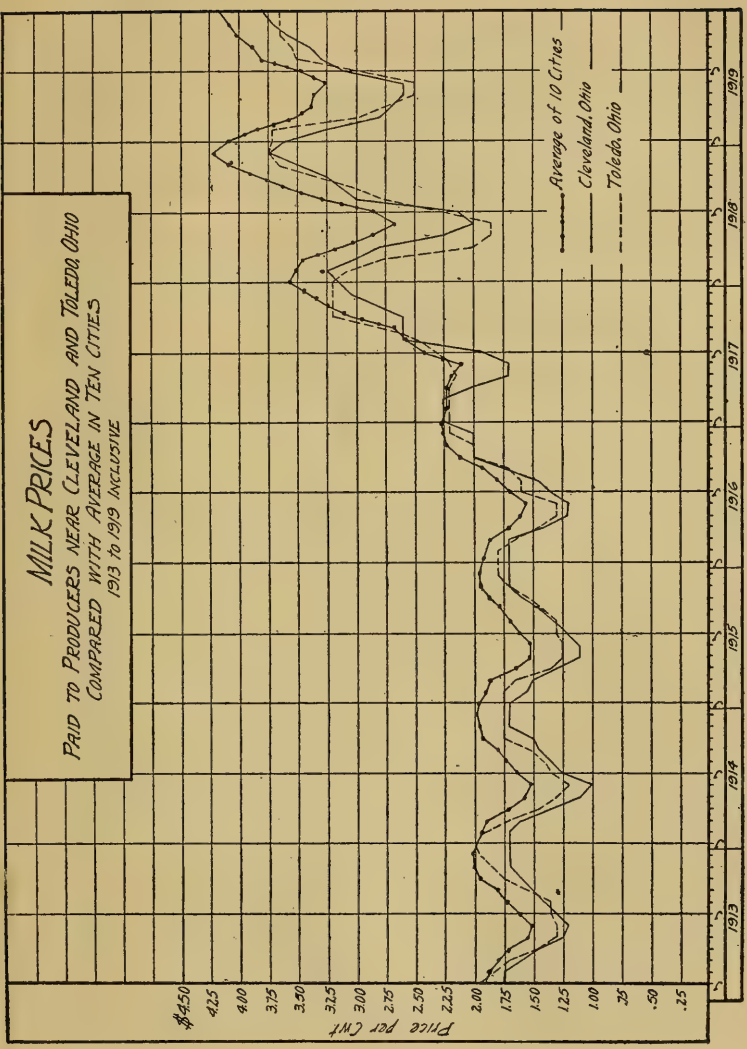

FIG. 18.—Milk Prices Paid to Producers near Cleveland and Toledo, Ohio, Compared with Average of Ten Cities.

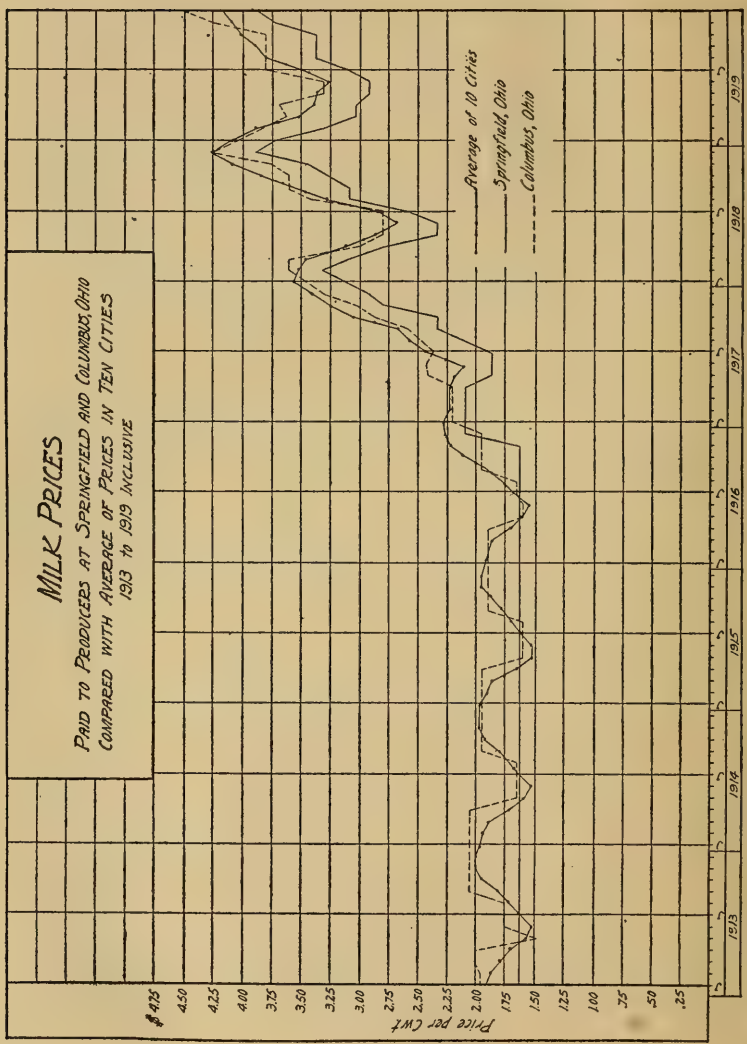

FIG. 19.—Milk Prices Paid to Producers at Springfield and Columbus, Ohio, Compared with Average of Prices in Ten Cities.

Figure 20 compares the San Francisco and Portland (Ore.) prices with the ten cities average. In both of these cities the producers have apparently lost ground slightly in the upward price movement. Both started in 1913 somewhat above the ten cities average, and both fell somewhat below it in the latter part of the period.

Can milk producers' associations influence milk prices? Temporarily they can undoubtedly do so. At least they have repeatedly done it. In the Chicago district in the spring of 1916, for example, the Chicago Milk Producers' Association was directly responsible for securing an increase of 22 cents per 100 pounds for the summer months. Similarly the Dairymen's League in the New York district secured a material advance in October and November of the same year. Undoubtedly such associations can be of tremendous service to the members in bringing about better prices at unfavorable times, particularly if sufficiently fortified with adequate and reliable data with which to justify their claims before consumers. On the other hand, how far can they go? The answer will depend upon the accuracy with which the producers have judged conditions of supply and demand in deciding upon the price they are going to ask. If, as a result of thorough organization, they succeed in securing too high a price, a surplus will result either from increased quantities of milk seeking the market for any of the reasons above given, or from a reduced demand. This would be true even though the milk producers all over the United States were thoroughly organized, for it must be remembered that there are in any large milk territory enough men who can turn to the production and sale of milk to cause a serious surplus should prices go too high. Many specific instances might be mentioned where cities whose prices

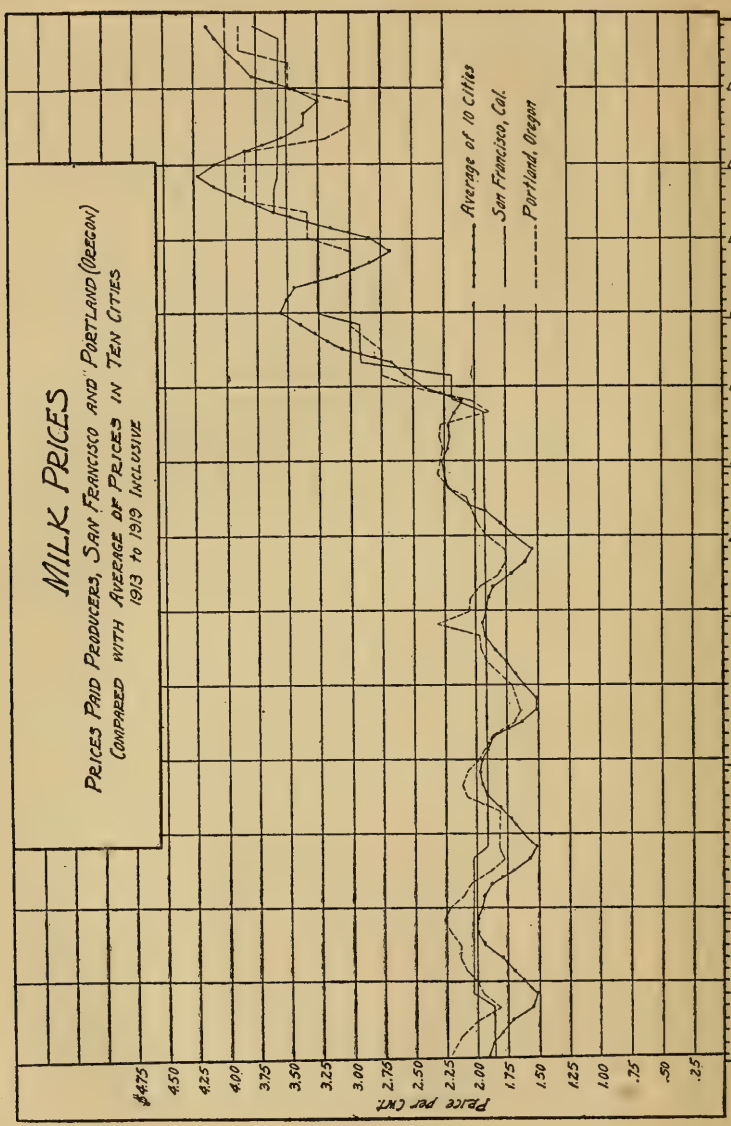

FIG. 20.—Milk Prices Paid to Producers at San Francisco, California, and at Portland, Oregon, Compared with Average of Prices in Ten Cities.

were slightly out of line with other markets at once got too much or too little milk. Producers' organizations have been very active during the past few years; yet a study of the charts showing milk prices from 1913 to 1919, inclusive, shows a rather remarkable similarity in the curves for the various cities.

Enthusiastic officers of producers' associations and others have often made extravagant claims as to gains resulting from collective bargaining. One writer, for example, has made a comparison of milk prices in the Chicago district for the year ending September, 1917, and for the year ending September, 1918, and claims for his association the credit for the entire gain over the preceding year.[1] Table XXXVIII compares the average Chicago prices for the two years with a number of other prices covering the same period. The Chicago milk price was 35.6 per cent higher in the second year, while the increase in the ten cities average was 40.3 per cent. During the second period New York butter prices were 16 per cent higher; the United States Department of Agriculture Index Number of Crop Prices was 18.4 per cent higher; the United States Department of Agriculture Index of Prices of Meat Animals was 28.7 per cent higher, and the "all commodities" index compiled by the War Industries Board was 15.4 per cent higher. If any gain to is be accredited to this particular association, it should be the difference between its gains and those of other commodities, such as New York butter prices, crop prices, or "all commodities" prices, and this credit would have to be shared with other associations, since it was doubtless the concerted movement of milk producers' organizations over

[1] *Milk News*, Sept., 1918, p. 8.

the entire country that helped bring milk prices somewhat nearer to the level of other prices. Certainly a study of the price charts offers little ground for any fears on the part of consumers that they are in the hands of a "milk producers' trust," as our daily papers sometimes charge. And this fear will continue groundless so long as every man is relatively free to go from one line of farming to another as he finds one or another more profitable, or to increase or decrease his milk production as he sees fit. Herein is the big difference between a true monopoly and a farmers' organization as at present constituted. The monopolist—a manager or a board of directors of a large corporation—decides to curtail production so as to realize a higher price. The entire control of the quantity to be produced is centralized. In a farmers' organization—be it a milk producers' association or a cotton growers' organization—each member is a law unto himself. Each may contract to sell all he produces through his organization, or he may even contract to produce only a certain amount. But with millions of scattered producers, monopoly methods would seem to be impossible, except for very short periods, say a few months or a year.

Perhaps one of the biggest weaknesses of producers' organizations of to-day is that the members expect to accomplish too much along the line of price increases and become discouraged if appreciable increases are not forthcoming.

Sectional variations in prices have often been commented upon as though they were wholly due to differences in the bargaining ability of organized producers in one section as compared with unorganized producers in another. This is undoubtedly the fact to some extent.

Compare, for example, prices at Toledo and Minerva,[1] both of which are practically condensery prices, but influenced by city conditions. (See Appendix D.) It is very likely, however, that more deep-seated causes are at the bottom of the differences than have been shown by studies so far made. That there are rather wide variations and that these are not always the same from year to year is shown in Table XXXIX, giving prices for the months of May, 1919, and May, 1920.

TABLE XXXVIII

Comparison for Year Ending September, 1917, and Year Ending September, 1918, of Chicago Milk Prices, Ten Cities Average Milk Prices, New York Butter (Creamery Firsts), United States Index of Crop Prices, United States Index of Prices of Meat Animals

	Chicago milk prices	*Average of milk prices in ten cities*	*Average N. Y. butter* [2] *prices*	*U. S. index number, crop prices* [3]	*U. S. index number, meat animals* [4]	*All commodities* [5]
Average, year ending Sept., 1917.....	$2.060	$2.292	$0.393	232.5	10.36	163.8
Average, year ending Sept., 1918.....	2.793	3.225	0.456	275.3	13.33	188.9
Per cent of increase.....	35.6	40.3	16.0	18.4	28.7	15.4

[1] Toledo, in northwestern Ohio, is in the heart of a condensery district in which producers have been almost entirely unorganized. Minerva, Ohio, is a small condensery center in the edge of the Pittsburgh milk zone, where producers are well organized.

[2] Creamery firsts, *War Industries Bulletin* 21, p. 21.

[3] *Monthly Crop Reporter*, Mar., 1920, p. 29.

[4] *Ibid.*, Feb., 1920, p. 9.

[5] *War Industries Bulletin* 2, p. 7, average of monthly indices of 1,371 commodities.

TABLE XXXIX

Average Milk Prices by Geographic Sections for May, 1919 and 1920 in Identical Cities, and Averages for the year 1919 [1]

Geographic sections	*Comparison of same markets*			*Average for 1919*	
	No. of local markets	*Average May, 1920*	*Average May, 1919*	*No. of local markets*	*Average price for city delivery*
United States	3,039	$3.17	$2.99	590	$3.50
New England	265	3.77	3.42	68	3.77
Mid. Atlantic	1,219	2.89	3.13	109	3.35
E. No. Central	584	3.01	2.61	189	3.25
W. No. Central	329	3.29	2.72	81	3.21
So. Atlantic	144	4.30	3.91	53	4.03
E. So. Central	120	3.17	2.87	9	3.40
W. So. Central	74	3.87	4.02	23	4.07
Mountain	121	2.98	3.11	18	3.12
Pacific	213	3.43	3.23	39	3.36

TABLE XL

Comparison of Average Prices of Milk for City Delivery and for Condensery Purposes by Geographic Sections, 1919

Geographic section	*For city delivery*		*For condensery*	
	No. of markets	*Price*	*No. of markets*	*Price*
United States	590	$3.50	244	$2.91
New England	68	3.77	5	3.39
Mid. Atlantic	109	3.35	82	3.29
E. No. Central	189	3.25	105	3.15
W. No. Central	81	3.21	10	2.84
So. Atlantic	53	4.03	4	3.03
E. So. Central	9	3.40	...	....
W. So. Central	23	4.07	...	....
Mountain	18	3.12	14	2.81
Pacific	39	3.36	24	2.91

[1] U. S. Bureau of Markets, Fluid Milk Market Reports, Mar. and May, 1920.

It must be remembered in making comparisons that the past year has been abnormal in many respects and that furthermore this is the first full year for which we have accurate data upon which to base such comparisons for the country as a whole.[1]

Table XLI compares the estimated returns on milk sold for cheese or butter manufacture with averaged prices received for milk sold for city delivery and for condensery purposes by months. It will be noticed that the prices received for city milk were highest, cheese coming second, condensed milk third, and butter fourth. It is probable that condensed milk would ordinarily come second in a more normal year, for condenseries have usually been able to drive cheese factories out of the immediate vicinities in which the condenseries were located. (See Figure 5, showing location of abandoned cheese factories about Monroe, Wisconsin.)

The prices given in Table XLI on p. 226 are the simple average prices (not weighted average prices), and represent the price received for milk testing 3.5 per cent butterfat.

Although only a small proportion of the total milk produced is required for condensery purposes (about 4.45 per cent in 1918, see Chapter II, Section 1), it is a considerable factor in the determination of whole milk prices, since so large a proportion of the condenseries are located in or near our city milk sheds. When the foreign demand for condensed milk fell off early in 1920, owing to the unfavorable rate of exchange, milk prices began to tumble, particularly in the New York and Chicago districts.[2]

[1] The U. S. Bureau of Markets began its market milk reporting service in the summer of 1918.

[2] *Milk News*, Mar., 1920, p. 1, and *Dairymen's League News*, Feb. 25, 1920, p. 1.

TABLE XLI

Prices by Months Received by Farmers for Milk Sold to Condenseries, Milk Sold to City Distributors, and Estimated Returns for Milk Sold to Creameries and Cheese Factories [1]

Month	*City distribution* [2]	*Condensing* [3]	*Cheese manufacturing* [4]	*Butter manufacturing* [5]
January	$3.81	$3.43	$3.40	$3.03
February	3.67	3.28	2.60	2.68
March	3.46	2.93	3.05	3.02
April	3.27	2.79	2.95	3.12
May	3.22	2.70	3.10	2.90
June	3.18	2.71	3.13	2.69
July	3.17	2.80	3.15	2.72
August	3.44	3.05	2.99	2.80
September	3.54	3.12	2.82	2.92
October	3.71	3.24	2.97	3.22
November	3.79	3.56	3.13	3.35
December	3.81	3.48	3.13	3.39
Average mon. prices.	3.50	2.91	3.04	2.98

Section 3. Determination of City Milk Prices

City prices themselves are complex and are determined by a complex set of forces. Milk usually sells in our large cities in four distinct classes. These are (1) retailed bottled milk delivered at the homes, (2) bottled milk

[1] *Market Reporter*, Apr. 17, 1920, p. 253.

[2] Average net prices compiled from fluid milk market reports issued monthly by the Bureau of Markets.

[3] Average net prices compiled from monthly condensed milk market report issued by the Bureau of Markets.

[4] Average net price approximated by multiplying Plymouth (Wis.) Cheese Board price of twins by 10 and adding 15 cents as compensation for value of whey.

[5] Average net price approximated by multiplying the average monthly quotation of 92 score butter on the New York market plus 3 cents by the basic butterfat content of milk (3.5 per cent) and adding 75 cents as compensation for the skim milk used on the farm.

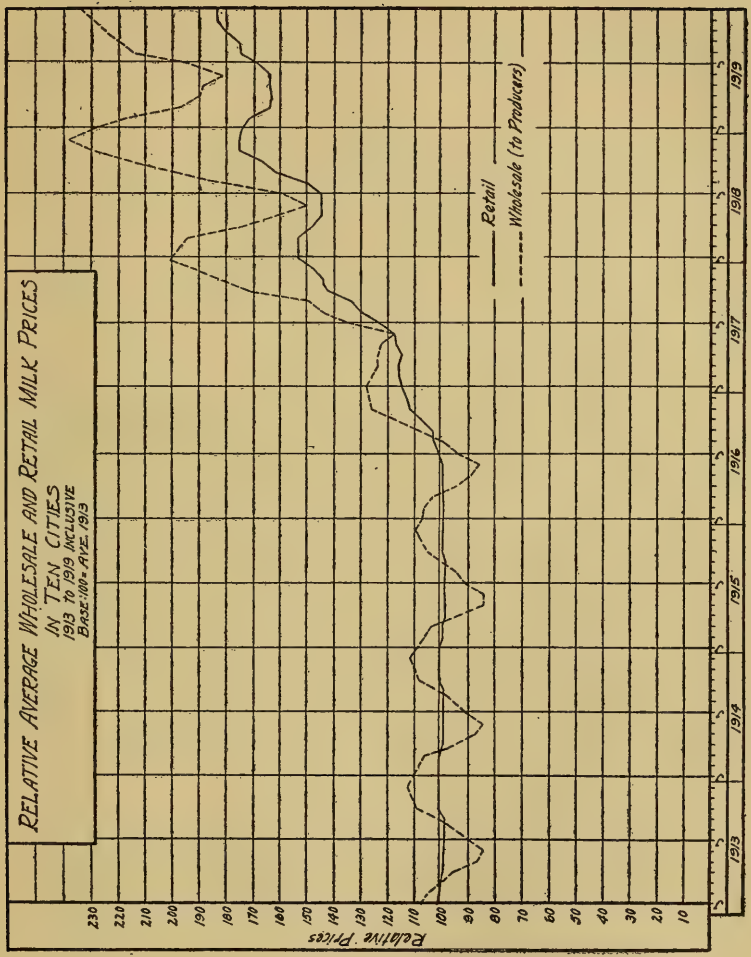

FIG. 21.—Relative Average Wholesale and Retail Milk Prices in Ten Cities.

retailed at stores and milk stations, (3) bottled milk wholesaled to hotels, restaurants, and stores, and (4) bulk milk at wholesale to hotels, restaurants, manufacturers of various products requiring milk, such as bakeries, candy makers, etc.

The various city prices may be thought of as being built up from the basic wholesale prices at which milk is purchased from producers, since, as pointed out in the preceding section, it is at this earlier stage that the various demands for milk make themselves effective in drawing milk into the particular channels in which the demand at the time happens to be strongest.

In each of the various classes of city trade, however, prices are determined, to a large extent, by separate and interacting forces. Thus wholesale prices of bulk milk may be entirely out of line apparently with wholesale prices of bottled milk, whereas retail prices are at other times apparently out of line. In Table XLII are shown prices paid to producers in June and December of 1919 in each of ten cities. Column 2 gives the retail price to the family trade, and column 3 the margin which the dealers took above prices which they paid producers. It will be noticed that the June margins vary from 5.50 cents per quart to 8.34 cents per quart, and the December margins vary from 4.45 cents to 7.12 cents.

In columns 4 and 5 are prices paid by the stores and other wholesale purchasers of bottled milk and the dealers' margins on this class of trade. These margins are from 1 to 2 cents lower than the margin on the retail trade, since both the retail and the wholesale bottled prices are usually given in whole cents, the latter prices being usually 1 or 2 cents below the retail delivered prices. Again there is no uniformity in the margins, which in this case

TABLE XLII—*Prices Paid Producers, Selling Prices of Retail Bottled Milk, Wholesale Bottled Milk, and Wholesale Bulk Milk per Quart, and Selling Margin on Each Class of Sales in Ten Cities for June and December, 1919* [1]

City	Producers' price	Retail family trade		Wholesale bottled		Wholesale bulk	
	cts.	Price cts.	Margin cts.	Price cts.	Margin cts.	Price cts.	Margin cts.
Los Angeles							
June	7.9	14.0	6.1	13.0	5.1	12.5	4.60
December	8.08	16.0	7.92	15.0	6.92	13.3	5.22
Denver							
June	6.0	13.0	7.0	11.0	5.0	8.75	2.75
December	7.15	13.0	5.85	12.0	4.85	9.37	2.22
Des Moines							
June	7.31	14.0	6.69	12.0	4.69	10.5	3.19
December	7.84	15.0	7.16	13.0	5.16	11.25	3.41
Milwaukee							
June	6.78	12.0	5.22	11.0	4.22	9.5	2.72
December	8.55	13.0	4.45	12.0	3.45	10.5	1.95
Chicago							
June	6.25	14.0	7.75	14.0	7.75	10.0	3.75
December	8.92	15.0	6.08	14.5	5.58	12.25	3.33
Detroit							
June	6.66 [2]	15.0	8.34	14.0	7.34	11.0	4.39
December	8.70	16.0	7.30	15.0	6.30	13.0	4.30
Pittsburg							
June	6.87	13.0	6.87	12.50	5.63	9.25	2.38
December	9.95	16.25	6.30	15.25	5.30	13.25	3.30
Philadelphia							
June	7.50	13.0	5.50	12.0	4.50	10.75	3.25
December	8.46	14.0	5.54	13.0	4.54	11.5	3.04
New York							
June	7.17 [3]	15.0	7.83	15.00	7.83	10.25	3.08
December	9.29	18.0	8.71	17.75	8.46	13.0	3.71
Washington, D. C.							
June	7.88	14.0	6.12	12.5	4.62	11.75	3.87
December	11.10	18.0	6.90	15.5	4.40	15.0	3.90

[1] U. S. Bureau of Markets figures as reported in *Creamery & Milk Plant Monthly* of July, 1919, and of Jan., 1920.

[2] Fluid milk only.

[3] Country milk station price.

vary from 4.22 to 7.75 cents in June to from 3.45 to 6.92 cents in December. Wholesale bulk prices are as a rule quoted by the gallon. The margins per quart in this case above prices paid to the producer are usually a cent or two lower than wholesale bottled prices. In this case the margins vary from 2.38 to 4.60 cents in June and from 1.95 cents to 5.22 cents in December.

It is obviously true that the price to each of these various classes of trade is not based exactly on the cost of the service involved. Costs vary for different dealers, sometimes rather widely, since here as elsewhere there are all degrees of efficiency and almost every conceivable combination of trade, from entirely retail businesses to entirely wholesale bottled or wholesale bulk businesses; but prices for each of these classes of trade are usually established with a fair degree of definiteness in any large city. The particular point at which price is established will be determined independently for each of these classes of trade somewhat by the relative costs, but perhaps more immediately by conditions of supply and demand and to a lesser extent by custom. The wholesale bulk trade, as well as the wholesale bottled trade, is frequently the starting points of price wars, since it is easy to make cuts on prices of milk in large quantities. In fact dealers often underbid each other in an attempt to sell all of their surplus milk.

It is claimed that in Pittsburg and Philadelphia from 90 to 95 per cent of the bottled milk is sold from retail wagons. This is a much higher percentage than is commonly found and is claimed to be partially responsible for somewhat lower costs of distributing milk in Pittsburg and Philadelphia.[1]

[1] King, Clyde, L., *The Price of Milk in Pittsburgh*, p. 17.

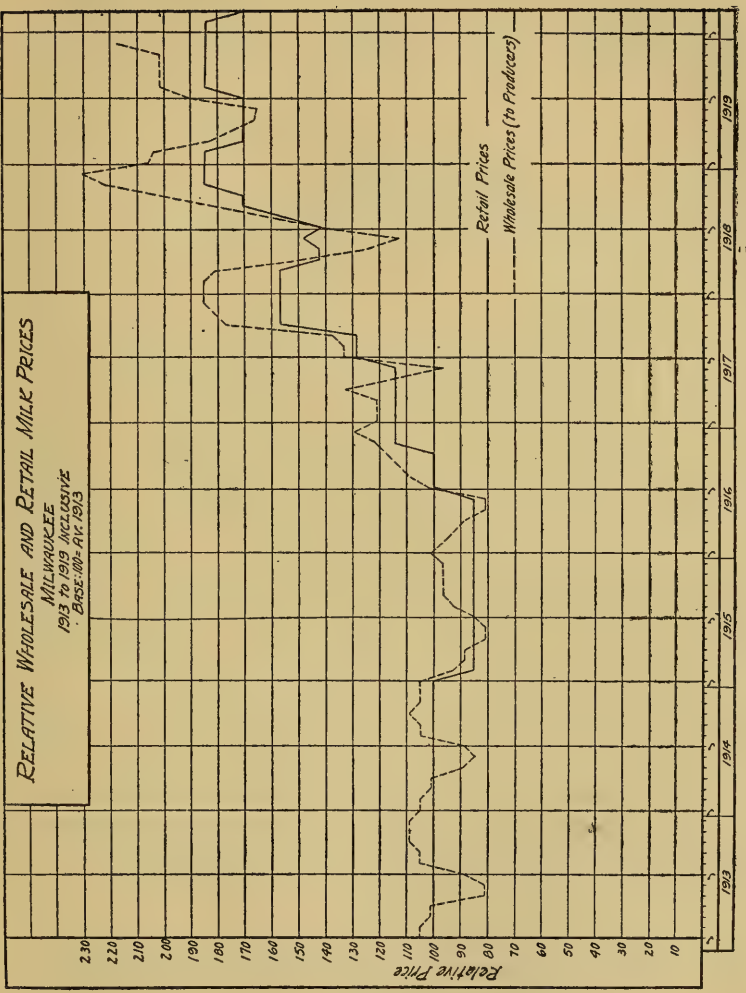

FIG. 22.—Relative Wholesale and Retail Milk Prices, Milwaukee, Wisconsin.

City prices have not fluctuated as widely as have prices to producers. Perhaps the main reason for this is the fact that milk consumption is so largely a matter of habit and that dealers find it to be rather expensive to bring back

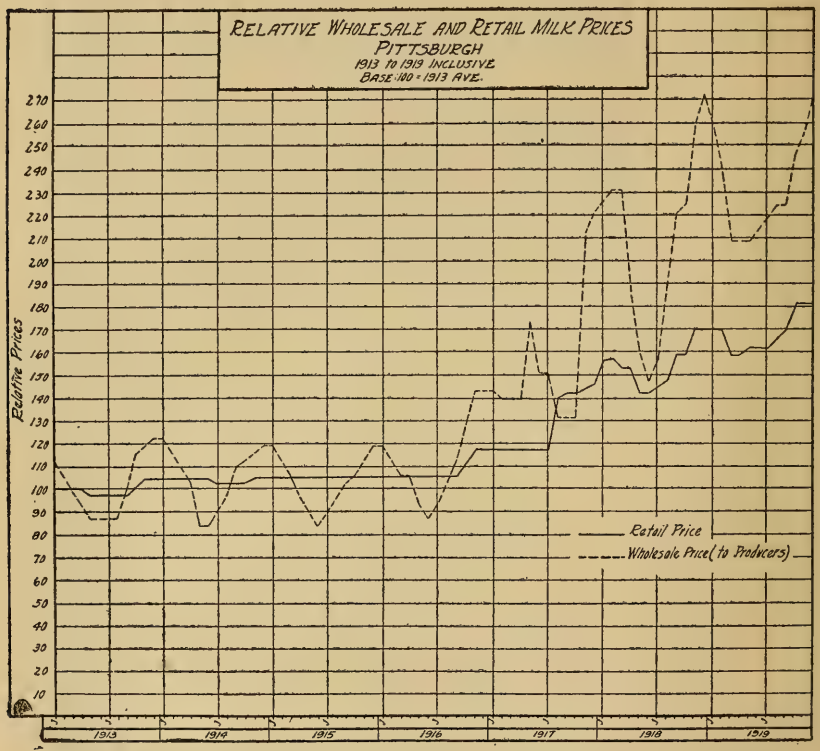

FIG. 23.—Relative Wholesale and Retail Milk Prices, Pittsburgh, Pennsylvania.

consumption to a normal rate in case an increase in price has for a time reduced the consumption. Another reason is that the demand for fluid milk is relatively inelastic, hence consumers would not, even with a very large cut in prices, take enough more milk than they ordinarily do

to make any material reduction in the summer surplus. Therefore dealers have operated on very narrow margins at certain times during the winter months, the aim being to make a profit on the season's business rather than to

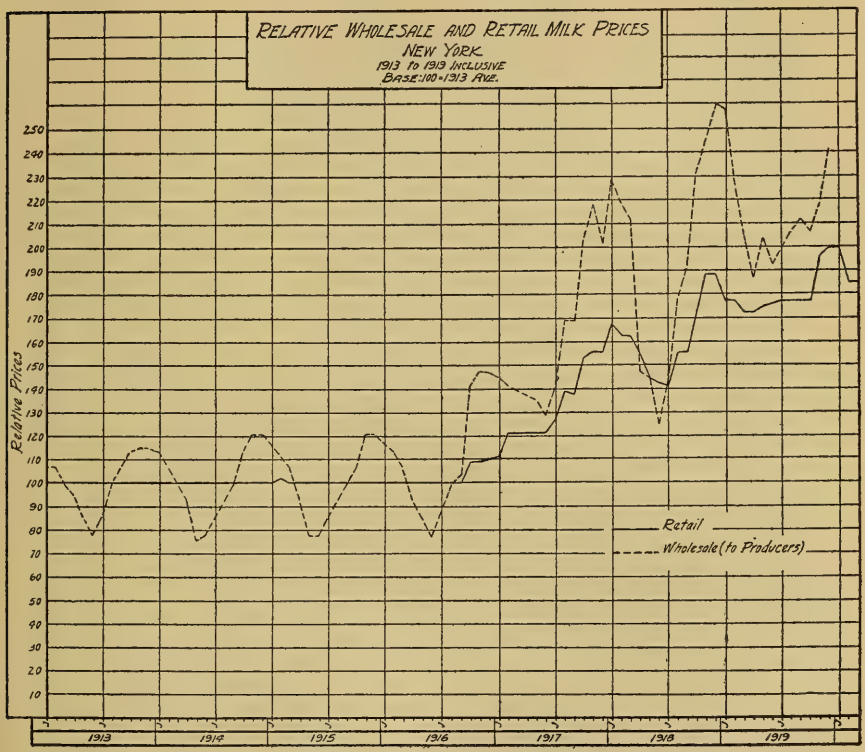

FIG. 24.—Relative Wholesale and Retail Milk Prices, New York City.

make a profit on each month's business.[1] Where these margins have been at all wide for any length of time, there has been a strong tendency for small dealers to cut under, often bringing on milk price wars. Even where prices

[1] See Figure 21 for relative retail and wholesale prices in ten cities.

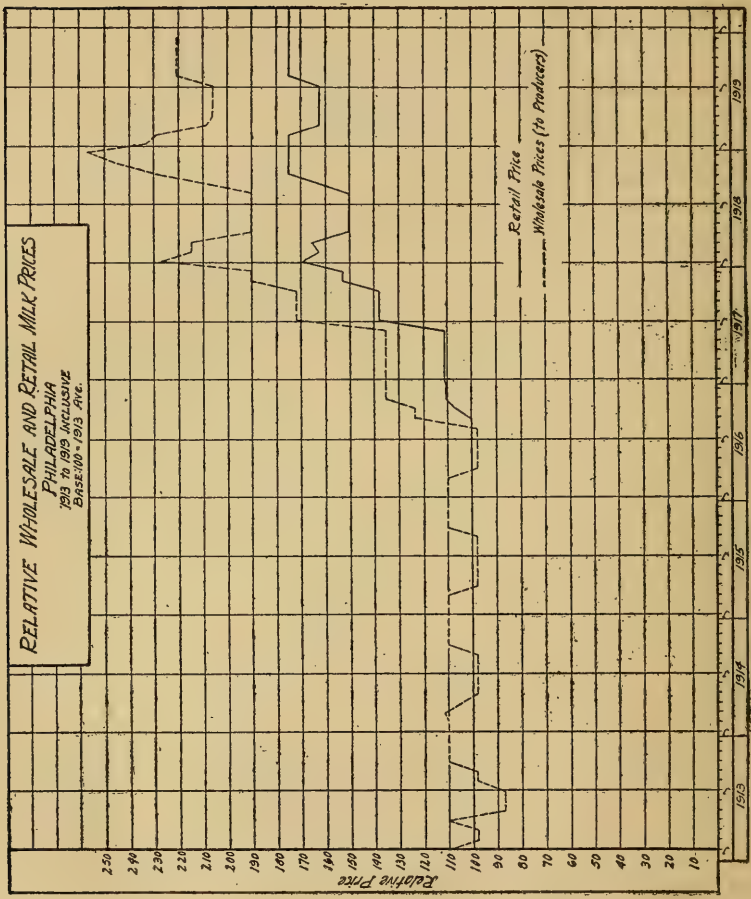

FIG. 25.—Relative Wholesale and Retail Milk Prices, Philadelphia, Pennsylvania.

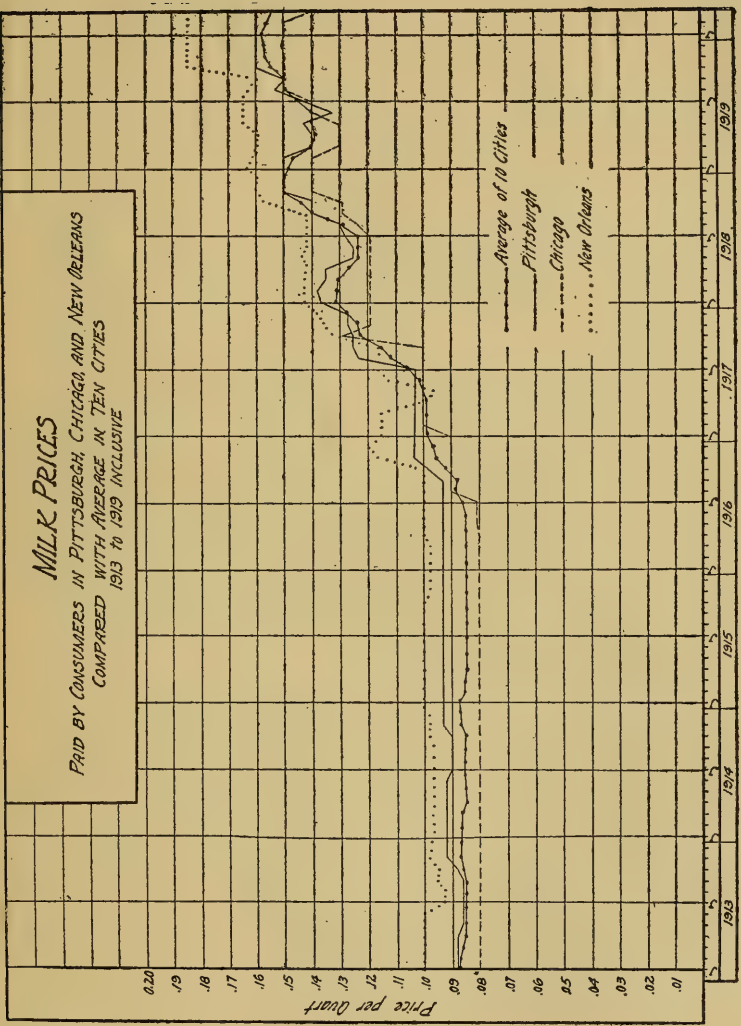

FIG. 26.—Milk Prices Paid by Consumers in Pittsburgh, Chicago, and New Orleans, Compared with Average of Prices in Ten Cities.

have been relatively low and margins correspondingly small, milk price wars have occasionally resulted from an attempt on the part of a new concern, or in fact of any concern, to win business by cut-price methods. For example, Milwaukee had 7 cent milk from 1913 to 1914, which price was about 1.5 cents below the average of the ten cities above named.[1] Early in 1915 a new company was organized which sought to gain business by cutting prices, thinking the prevailing margin to be too wide. The result was a price war and 6 cent milk for seventeen months. Prices were for the most part at that time about 2.5 cents below the other nine cities. Another instance in point is the milk war in Columbus, Ohio, in the winter of 1919-1920, which resulted because one dealer sought to gain favor and business by remaining at 14 cents per quart when most of the other dealers raised their retail price to 15 cents. The result was that the other dealers soon came down to 14 cents. Later it was claimed that this margin was so narrow that many of the dealers suffered losses, that none made reasonable profits, and that prices will have to go up in the near future.[2]

It is difficult to say to what extent producers' organizations have had an influence on city retail prices. It is true that where producers have at certain times secured material advances in prices paid to them, the dealers have at once raised the prices to consumers in the various classes of trade. Figures 26, 27, and 28 show the average retail prices in ten cities as reported by the United States Bureau of Labor Statistics compared with those of a number of individual cities.

[1] Milwaukee, Chicago, New Orleans, Pittsburg, Philadelphia, San Francisco, Detroit, Baltimore, New York, Cleveland.

[2] Prices did go up to 15 cents in Sept., 1920 remaining there until Feb., 1921.

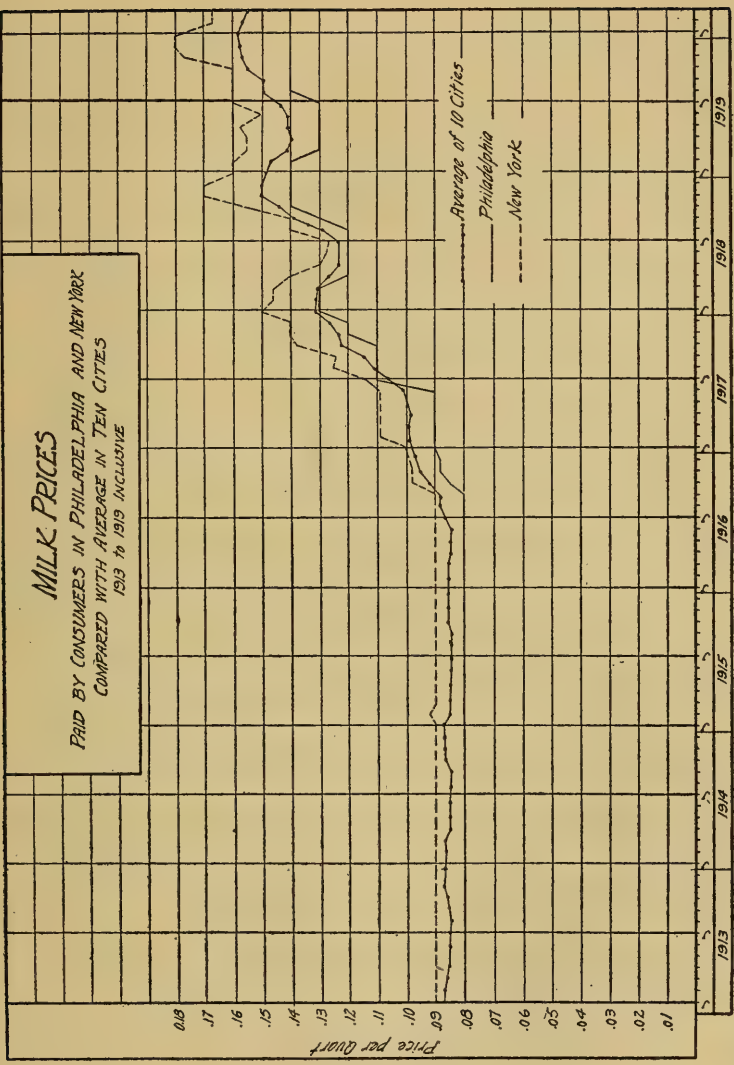

FIG. 27.—Milk Prices Paid by Consumers in Philadelphia and New York Compared with Average of Prices in Ten Cities.

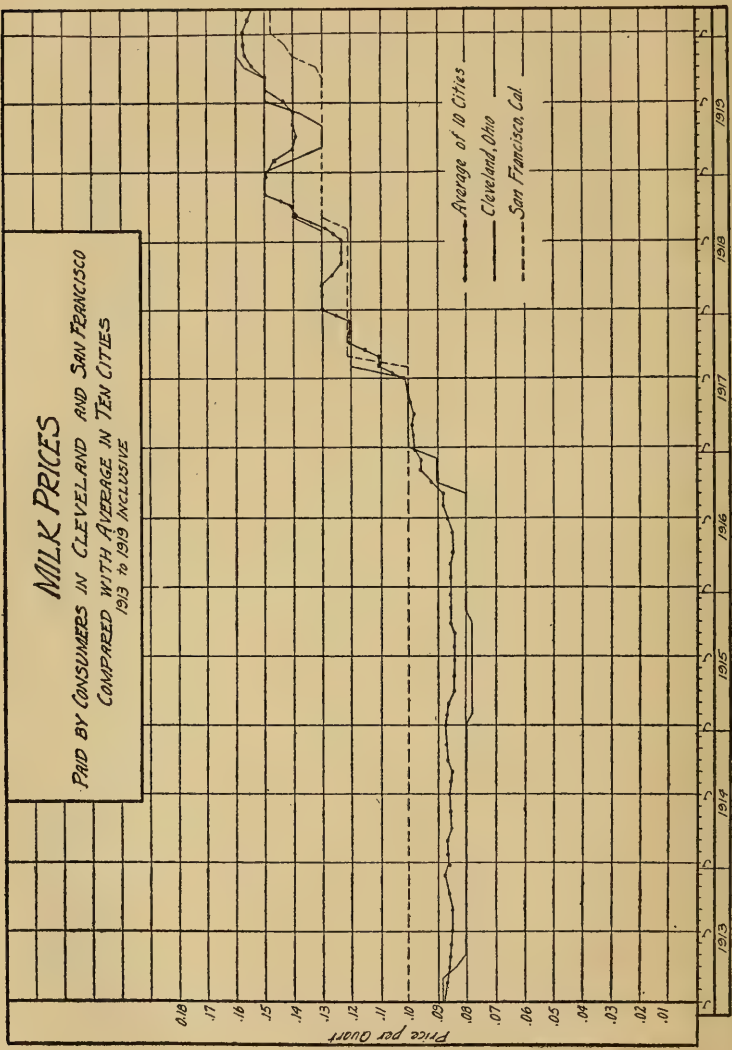

FIG. 28.—Milk Prices Paid by Consumers in Cleveland and San Francisco Compared with Average of Prices in Ten Cities.

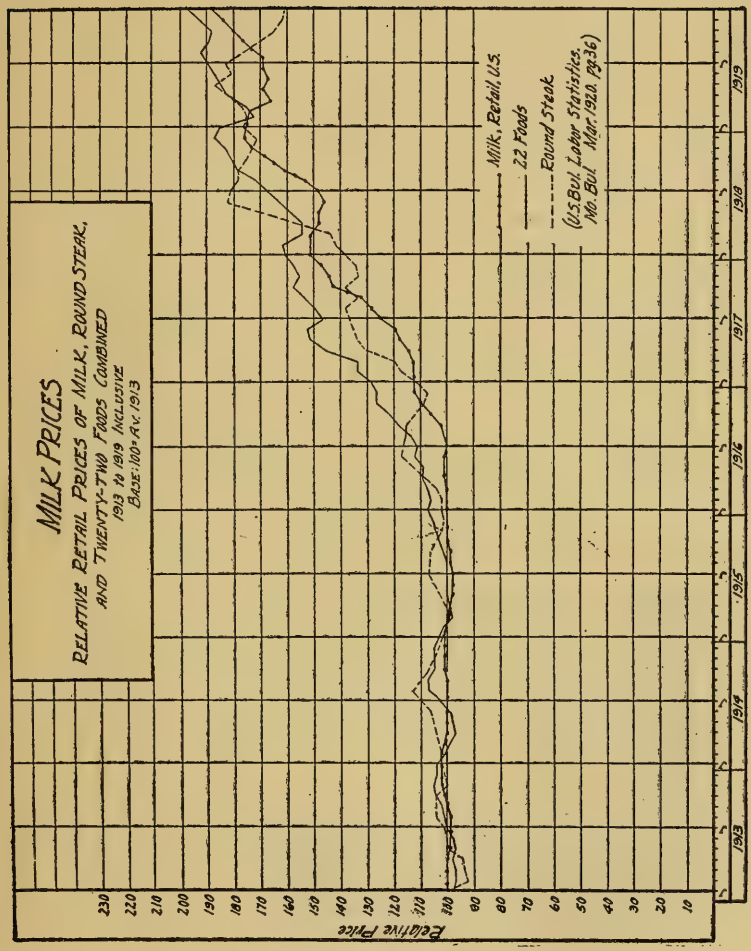

FIG. 29.—Relative Retail Prices of Milk, Round Steak, and Twenty-two Foods Combined (Averages for the United States).

Producers are apparently getting a somewhat greater portion of the consumer's dollar than they did in 1913. This is indicated by Figure 21, comparing the relative average prices of milk in ten cities paid to producers and paid by consumers. It will be noticed that relatively the wholesale prices to producers have gone up somewhat more rapidly than have the retail prices. Figures 23 and 25 show the relative wholesale and retail prices in Pittsburg and Philadelphia respectively. In the case of Philadelphia particularly it appears that the dealers' margin has been growing relatively narrower. In the case of New York (Figure 24) the wholesale price to producers has gone up nearly as rapidly as in the case of Pittsburg. In Milwaukee, however (Figure 22), the relative retail and wholesale prices seem to have remained fairly close together, probably because of the fact that the margin during the basic period of 1913 was quite narrow in that city.

Milk is not the only commodity, however, in which the spread between retail price and wholesale price has become relatively narrower. The War Industries Board reports fifteen commodities on most of which the wholesale price has gone up more rapidly than has the retail price.[1] Table XLIII on p. 241 gives the index numbers for several of these.

In Figure 29 a comparison between average retail milk prices and average retail prices of twenty-two foods shows that relatively milk prices moved upward more regularly and more slowly than did prices of other foods.

[1] *War Industries Bul. 3*, pp. 551–552.

TABLE XLIII

Relative Wholesale and Retail Prices of Foods

(*Note*: *W* = *Wholesale*, *R* = *Retail*)

Article and city		*Average for 1913*	*January, 1919*	*April, 1919*
Beef, Chicago				
Steer, rounds #2	W.....	100	168	183
Round steak	R.....	100	168	177
Pork, Chicago				
Loins	W.....	100	181	211
Chops	R.....	100	185	199
Butter, Chicago				
Creamery extra	W.....	100	213	197
Creamery extra	R.....	100	197	185
Milk, Chicago				
Fresh	W.....	100	221	168
Fresh, bottled, delivered	R.....	100	175	163
Milk, New York				
Fresh	W.....	100	263	174
Fresh, bottled, delivered	R.....	100	178	172
Milk, San Francisco				
Fresh	W.....	100	190	190
Fresh bottled	R.....	100	140	140
Eggs, Chicago				
Fresh, firsts	W.....	100	260	174
Strictly fresh	R.....	100	238	160
Corn meal, Chicago				
Fine	W.....	100	257	229
Fine	R.....	100	200	200
Potatoes, Chicago				
White, good to choice	W.....	100	190	180
White	R.....	100	180	167
Poultry, New York				
Dressed fowls	W.....	100	195	195
Dressed fowls	R.....	100	191	195

CHAPTER VII

CONSIDERATION OF PROPOSED REMEDIES

Section 1. Classification of Remedies

It has already been shown (Chapter II, Sections 2, 4, and 5) that milk is a particularly vital factor in the welfare of a community. A recent investigating committee puts the case thus: "There are increasing numbers of us contending that the milk business should be classified with the public utilities. In certain age groups, it has been pointed out, milk is almost as essential as air and water. In the life of the community the consumption of milk is infinitely more important than the operation of the transportation lines, the proper management of gas and electric plants, the operation of ferries, and the oversight of any other function which by common consent has been called a public utility and placed under governmental control." [1]

Many suggestions for remedying the evils of the milk business have been brought forward, some of which will be examined in considerable detail. Others have already been considered to some extent. The principal remedies which have been proposed may be classified under ten heads:

1. Municipal ownership. Ownership and operation by the city of all or a portion of the milk business.

[1] Report of Fair Price Committee of the City of New York, New York Legislative Document No. 29, 1920, p. 37.

2. Privately owned and operated but publicly regulated monopoly. Existing companies to combine and form a large company. Regulation to be by some body of public spirited men representing producers, distributors, and consumers.

3. Coöperation among dealers to eliminate present duplication; present competitive system in other respects to be retained.

4. Coöperative distribution by producers. Proposed by producers who believe that dealers charge excessive prices and thus reduce consumption and then in turn hold the surplus thus created as a club to beat down prices to producers.

5. Consumers' coöperation.

6. The milk commission plan.

7. The milk arbitrator plan.

8. Store or milk station plan. Proposed as a method of eliminating duplication and cheapening distribution.

9. Zoning of our cities so as to eliminate duplication.

10. Collective bargaining as a means of eliminating many of the evils of the present system without some of the radical changes above suggested.

Section 2. Municipalization of Milk Distribution

Municipalization of the distribution of milk has so often been proposed that the subject merits rather careful consideration at this point.[1] Although this proposal has been

[1] The following instances in which this proposal has been brought forward have come to the writer's attention:

1. Proposed for Milwaukee, 1914; see *Milwaukee Journal*, Oct. 1, 1914.

2. Said to have been provided for in Wellington, New Zealand; Savage, *Milk and the Public Health*, p. 368.

3. Proposed for Cleveland, Ohio; *Dayton* (O.) *Herald*, July 28, 1919.

spoken of as "a passing phase of public opinion," which opinion is "notoriously fickle," its proponents in some instances have made fairly good cases.

Can the distribution of milk be considered a public function? Various writers have sought to show that it is as much so as water supply, gas, or electricity. Spargo, for example, seeks to show that impure milk is of more danger to children than impure water, the supplying of which is quite generally recognized to be a proper public function.[1] With regard to milk for infant consumption, he goes so far as to say that the municipality should produce and distribute at least this portion of the supply.[2] Another writer, after citing numerous court decisions to show that the supply of water has been considered by the courts to be a proper municipal function, compares water and milk as follows:[3]

4. Proposed in Wisconsin legislature, spring of 1919, for Wisconsin cities; *Creamery & Milk Plant Monthly*, Apr., 1919, p. 39.

5. Proposed by Mayor of Jamestown, N. Y., who presented elaborate figures in support of his claims of advantages to the city. See *American City*, Vol. X, p. 50, Jan., 1914.

6. Taken up by Chamber of Commerce at Corning, N. Y.; *Creamery & Milk Plant Monthly*, July, 1918, p. 22.

7. Proposed in bill introduced in New York legislature providing for municipal milk supply in New York City; *Ibid.*, Mar., 1918.

8. Proposed for Tacoma, Washington; *Milk News* (Chicago), Nov., 1918, p. 14.

9. Proposed for New York City; Jennings, Irwin J., *A Study of New York City Milk Problem*, National Civic Federation, 1919.

10. Proposed for Winnipeg, Canada; Hughes, R. D., *Report on Municipal Milk Supply for the City of Winnipeg*, 1919.

11. Proposed as a last resort for Rochester, New York; North, Chas. E., *Report of Rochester Milk Survey*, 1919.

[1] Spargo, John, *The Milk Question*, p. 176.

[2] *Ibid.*, p. 220.

[3] Jennings, Irwin G., *A Study of the New York Milk Problem*, p. 51.

First Parallel

Water	*Milk*
1. Municipality uses it.	1. Municipality uses it proportionately less.
2. Universally used by inhabitants.	2. Universally used by inhabitants.
3. Constantly used.	3. Constantly used.
4. Essential to public health.	4. Essential to public health.
5. No substitutes.	5. No substitutes.
6. Must be clean and pure.	6. Must be clean and pure.
7. Will carry infection.	7. Will carry infection
8. Quality must be controlled.	8. Quality must be controlled.
9. Main sources outside city.	9. Main sources outside city.
10. Private interests may sell under special authorization.	10. Private interests may sell without special authorization.
11. Business tends towards monopoly.	11. Business tends toward monopoly.
12. Usually requires power of eminent domain.	12. Does not require power of eminent domain.
13. Makes peculiar use of public streets, necessitating special grant.	13. Does not do so.

In the same way he compares the milk supply with the supply of wood and coal under the heading "Cases held not to warrant public ownership." In this instance he shows that the milk supply conforms to more of the essential requirements for municipalization than does the supply of coal or of wood for fuel.[1] But municipal coal supply has already been attempted and at least one state educational institution has sought to direct such activity by

[1] Jennings, Irwin G., *A Study of the New York Milk Problem*, p. 54.

sending out a bulletin explaining methods of conducting municipal coal yards.[1]

On the other hand, the view is frequently held that the proper handling of many other commodities is as vital to the public welfare as is the milk supply. The question is raised: "If municipal milk, why not municipal groceries, municipal drugs, etc.?" [2]

Most proposals have not been very specific as to proposed methods of acquisition and financing of the milk business. Usually it has been proposed to purchase at an appraised value the existing businesses. The exact method would doubtless depend upon the extent of municipalization. If all of the milk business is to be taken over, the city would have to take over the business of all the present dealers. If only a small part of the business is to be undertaken, a desirable plant might be purchased or one might be built.

The original financing would undoubtedly have to be done by bonding the city. In one instance, however, a chamber of commerce has proposed to sell shares to producers and consumers, the voting power to remain in the hands of the chamber of commerce.[3] It might be feasible to finance such an undertaking by issuing bonds for a part of the price, then by issuing milk plant certificates for the balance of the appraised value, these certificates to be similar to preferred stock. The latter method would probably be the most convenient for a city which was already approaching its debt limit, since such certificates would doubtless not be considered a part of the city debt.

[1] University of Wis. Mun. Ref. Bul. 4, May, 1918, reported in *American City*, Vol. XIX, p. 11.

[2] *Creamery and Milk Plant Monthly*, Jan., 1917, p. 17, and Feb., 1917, p. 21.

[3] Proposal by Chamber of Commerce of Corning, N. Y.

The exact plan, of course, would have to depend upon local conditions and state laws.

The method of control of such a business would certainly be a matter of vital importance. It would seem that the main points to be considered are (1) efficiency of management; (2) responsibility to the public; (3) elimination of politics and corruption.

One of the plans which would bid fair to comply with all the above points is that proposed for the city of Winnipeg, Canada. This provides that a commission of three members be appointed to act as a city milk commission, one member to be elected by the producers, one by the Winnipeg Trades and Labor Council, and one by the Greater Winnipeg Board of Trade. This commission should be appointed for not less than three years. In addition one member of the council and one member of the city health department should be ex officio members, and attend all meetings.

The main duties of this commission were to be, first, to appoint a manager of the plant, who should have full power and responsibility as to the hiring and discharging of employees; and second, to determine the price to be paid for milk and the price to be charged.[1]

If the conduct of the municipal plant were left to the management of the city council in the average American city, a vast amount of inefficiency, politics, and corruption would doubtless creep in, since, if the service is satisfactory and the rates are fairly reasonable, the consumer is often utterly indifferent to what goes on, and, if the service is unsatisfactory, he is not very likely to arrive at a correct solution of the difficulty.[2]

[1] *Report on Municipal Milk Supply for the City of Winnipeg*, p. 10.

[2] See *Problems of City Government*, L. S. Rowe, Chap. 10, and *Essays in Municipal Administration*, John A. Fairlie.

If undertaken at all, municipal milk distribution should be undertaken on a self-sustaining basis. Consumers cannot know whether the business is efficient or not if accounts are mixed up with other accounts, or if accounts are not kept in a businesslike way. The Philadelphia council, for example, instead of keeping up its gas plant, used part of the revenue from this plant for the purpose of reducing general city taxes, thus making a false showing as to real savings. In the meantime the plant was deteriorating.[1] One writer has even proposed that such municipal utilities as electric light or street railway service should be required to conduct themselves exactly as if they were commercial enterprises, selling their services at a fair price, paying taxes at the usual rate, and entering into the cost statement all municipal salaries properly chargeable to these enterprises.[2]

Just what would be the relative advantages and disadvantages of the municipal operation of a milk distributing system? As a matter of fact we have no way of knowing, since nothing of the kind has ever been tried. The best we can do is to consider evidence of a theoretical nature, if it can be called evidence, and to consider what has been done in related fields.

Theoretical gains from centralized operation have already been considered in the chapter on distribution.[3] An estimate similar to those already given but of a less thorough and detailed nature was made in the report on the municipal milk supply for the city of Winnipeg.[4] Taking into consideration existing wages, this report

[1] L. S. Rowe, *Problems of City Government*, p. 248.

[2] Lincoln, E. E., *Results of Municipal Electric Lighting in Massachusetts*.

[3] Chapter IV.

[4] Report on Municipal Milk Supply for the City of Winnipeg.

estimates that an annual saving could be effected by a municipally owned milk monopoly as compared with the existing competitive system of about $230,348. These savings were to be made on the following items and in the indicated amounts:

Management	$10,000
Office staff	4,160
Plant staff	29,952
Stable staff	6,440
Drivers	143,000
Horses	32,120
Wagons	3,500
Sleighs	1,176
Total annual savings	$230,348

This saving on 56,000 quarts, the daily consumption at the time this report was made, would amount to 1.12 cents per quart.

A similar estimate was prepared by Mayor Carlson for the city of Jamestown, New York.[1] In all these estimates big potential gains are shown on paper. Could these be realized? The theoretical gains of 2 cents per quart in Rochester, of 1.5 cents in Kansas City, and 1.2 cents in Winnipeg could be dissipated very readily by inefficient management.

On the other hand, with the development of a higher standard of citizenship, it should be possible to overcome these difficulties. In fact, if we are to judge by the num-

[1] *American City*, Vol. X, p. 50, Jan., 1914. The City of Jamestown, New York, has recently acted upon the above suggestion and has voted to issue $150,000.00 of bonds to finance a city milk plant. See *Hoards Dairyman*, Sept. 10, 1920, p. 290.

ber of successful municipal enterprises in this country at present, we must come to the conclusion that there are possibilities along this line. In 1918 it was reported that 35.5 per cent of all the lighting systems in the United States were municipally owned.[1] In another publication an "eminent authority" is reported as saying that in one hundred fifty American cities electric light rates under private ownership ranged from ten cents up and under public ownership from ten cents down.[2] One difficulty with many such comparisons is that the reader never knows whether the rates reported for the municipally operated enterprise were actually sufficient to maintain the plants intact and cover all proper expenses, or whether some of the supervision, for example, was not charged up to the plant.

Thus far all our considerations have been based on economic gains or losses. One argument for municipal ownership of milk plants is based on the theory that it should be undertaken for the benefit of the public health. One writer, for example, expresses the firm belief that municipalizing the milk supply "will be found to be the effective way, not only to check, but to wipe out milk-borne disease." [3]

Advantages to the producer, if indeed there were such advantages, would materialize only in case the system proved to operate smoothly and efficiently. The city consumer, through the efficient manager in charge of the plant, would doubtless drive as hard a bargain as would any private dealer seeking profit, and might be even more arbitrary, because he would have much more of monopoly

[1] *American City*, Vol. XIX, p. 419. Article gives numbers by states.
[2] *Pacific Municipalities*, Vol. XXXIII, Dec., 1919, p. 465.
[3] Straus, Lina G., *Disease in Milk*, p. 347.

power. Hence farmers would actually have their marketing alternatives reduced. Instead of having a choice of different dealers in the same city as well as different cities, and different use-demands, they would have only the last two choices.

The consumer on his part would have to forego the satisfaction at present enjoyed of selecting from among several dealers according to the dictates of personal preference. At present many consumers have very decided preferences, based on such grounds as variation in quality of milk, differences in time of delivery, or even personal like or dislike of the dealer himself.

Does the plan seem feasible and desirable? The answer would seem to depend very largely upon local conditions. With an alert citizenship who would put in power a responsible man or set of men of ability who would be held to account, such a plan should work. In most American cities, however, it is doubtful whether the plan would be found satisfactory. Most of its advocates have, as one writer puts it, tended to "minimize practical dangers in organization and operation." [1] A big disadvantage might be found in the fact that much of the skill developed in the milk business by long years of experience would be lost by replacing experienced men with inexperienced politicians. On the whole it is a question whether the form of government in most of our cities is readily adaptable to taking over so complicated a business as that of supplying milk.

Section 3. Publicly Regulated Private Monopoly

Another remedy which has perhaps even more frequently been proposed than has municipal ownership is

[1] MacNutt, J. S., *Modern Milk Problem*, p. 140.

that of a legalized monopoly under public regulation. Argument in favor of this plan is based largely upon the same grounds as is that for municipal ownership, the main difference of opinion being on the point of the relative efficiency of private as compared to public enterprises and on the proper scope for governmental activity.

The report of Dr. Charles E. North on his survey of the milk supply of the city of Rochester recommends that legislation be secured enabling Rochester or any city in New York either to purchase or to control the milk business within its boundaries, and that the city authorities be given access to all books and records. The report recommends particularly "that the city authorities encourage the centralization of the business of milk distribution under the auspices of the present industry with the object of avoiding, if possible, the establishment of municipal ownership through the securing of efficient service under private ownership." [1]

An elaborate plan was proposed by Mr. P. D. Fox, vice-president of the Borden Farm Products Company, providing for a regulated milk monopoly.[2] The gist of this proposal is so concise that it can best be quoted:

"Pass a special enabling act that would be confined by its terms to the business of fresh milk distribution in the so-called metropolitan district. Let the advantages of operating under the act be sufficiently real so that it would induce most, if not all, of the distributors to avail themselves of its benefit. (It is assumed that no law which attempted to compel a distributor to turn over his business to a new corporation would be constitutional.) Let the act contemplate the formation of a corporation with a capital stock divided into preferred and common

[1] North, Dr. Chas. E., *Milk Survey of the City of Rochester*, pp. 220–221.
[2] *Dairymen's League News*, Jan. 10, 1920, p. 1.

shares, the preferred stock to be issued dollar for dollar to the extent of the value (appraised as mentioned below) for the net quick or current assets, cash, accounts receivable, etc., of the distributors availing themselves of the plan and the common stock to be issued dollar for dollar to the extent of the net value (appraised as before) of the fixed assets (land, buildings, plant, equipment, etc.). Let no stock be issued for good will. The plan thus far contemplates an obviously sound capitalization. Confine the operations of the new company to the business of dealing in milk, cream, butter, cheese, and, if desired, other food products, but exclude condensed milk, evaporated milk and other manufactured milk products so as to conserve the milk supply adjacent to New York City for the fresh milk requirements of the city's population and thus discourage, as far as practicable, milk manufacturing in this adjacent territory, except as it may be needed to preserve from loss the seasonal surplus milk. Let the corporation be managed by a board of directors in which the dairymen and the public will have representation, such representatives to be chosen in a manner that will inspire public confidence. Let there be a board of appraisers appointed, for example, by the Chief Judge of the Court of Appeals and chosen from men of established reputation as appraisers or certified public accountants doing business in the State.

"Let this board determine the value of the assets to be acquired by the new corporation. Permit any distributor to apply within a limited time after the passage of the act for admission to the corporation, submitting his inventory of assets for appraisal and when appraised at their fair market value as a going concern, let the stock to which the distributor is entitled be issued, unless he elects to reject the same and remain out of the corporation. Require the directors of the new company to dispose of plants or other assets when in their judgment they are no longer required for the proper and economical operation of the business, thus eliminating unnecessary duplications, and let the proceeds of such sales be used for the retire-

ment of the preferred stock at par unless needed as working capital in the business. Let the new company enjoy, if it can earn it, an average annual net income from its milk business and available for dividends of one-half a cent a quart of milk purchased and handled by it. Provide that if the net income in any one year exceeds that limit by an amount more than sufficient to make up the average permitted net income from preceding years, the disposition of the excess shall be determined by a board of arbitration, which, like the board of appraisal, shall consist of three members and be appointed by (for example) the Chief Judge of the Court of Appeals and chosen from among the leading business men of the state. In this way remove the incentive to try to make greater profits than the limit fixed by the law. During the war both the government and business had considerable experience in price fixing, and as a result thereof it is generally conceded that the limitation of profits works better than arbitrary price fixing. While the former does, of course, have a deterrent effect in attracting new capital for needed improvements and extensions, still it does not run counter to the economic law of supply and demand, whereas the latter is open to both the objections above noted, and furthermore is objectionable because it is impossible to conduct business on the basis of a controlled selling price and of uncontrolled costs. Require the corporation to file a financial report each year with the state comptroller showing its financial condition and the amount of net income realized and to permit an inspection of its books, records, and accounts."

The plan was to become operative "when two or more of the distributors doing in the aggregate a very substantial part of the fresh milk business in the metropolitan district joined the new corporation."

The salient points in his plan were thus outlined: "Sound capitalization, limited profits, full publicity, participation of producers and consumers in the board of

directors, immediate savings in distributing costs through the elimination of some of the duplicated investments and service, and further savings of the same kind through the gradual elimination of unnecessary points of operation, the institution of trade reforms, such as (to choose but one example) requiring a deposit on bottles, thus insuring the coöperation of the consumer in this respect, increasing the distributing capacity of the wagons and thus reducing the delivery cost per unit, increasing the volume of milk handled at the country depots and pasteurizing plants, thus reducing the per unit country costs, conserving in the industry individual initiative, (and conserving) the skill of men long experienced in the conduct of a specialized business which in a large measure might be lost under other plans which have been suggested (*i. e.*, municipal ownership and operation)."

Such a plan has actually been tried in Calgary, Canada, where the business of the large companies was, at the suggestion of the food controller, so revised as to give 90 per cent of the fluid milk business to one company. The other leading companies confined themselves to ice cream and butter manufacturing respectively. The plan is said to be working well from the point of economy of distribution and to have reduced the number of delivery wagons from fifty to thirty-one.[1]

This plan could hardly do away with all the evils of competition at once unless some way could be found whereby the city could limit the number in the business, practically compelling all dealers to join the one company. This last point would doubtless meet constitutional objections in any of the states. The particular advantages claimed for such a scheme as compared with municipal

[1] *Hoard's Dairyman*, Oct. 17, 1919, p. 551.

ownership are that greater efficiency in operation could be secured than would be possible if the city operated the business itself. In common with municipal operation its big advantages would be all the economies of large-scale operation together with the elimination of duplication and also the betterment of quality resulting from the use of more up-to-date equipment and greater facility in regulating by the health authorities.

Many consumers, however, and producers as well, harbor a great fear of any large corporation and would be very credulous of any agitator's wild or malicious charges. A fatal weakness of such a scheme is quite likely to be that the public would almost certainly be unwilling to allow adequate revenue. Note, for example, the attitude of our various governing bodies toward the railroads and other public utilities under regulation. In perhaps a majority of instances revenues are inadequate to attract capital sufficient to keep these utilities abreast of public needs. In the opinion of the writer, regulation of a milk utility would have to be by a State Commission somewhat similar to our public utilities commissions, since any city commission would very likely be too easily drawn into politics over minor issues. The recent experience of Columbus, Ohio, in refusing to grant its street railway company an adequate return, and of Toledo, Ohio, along the same line, add weight to the conclusion that a publicly regulated corporation would get fairer treatment from state than from city authorities. The failure of the public generally to understand the source and nature of profits is likely to forestall the introduction of more efficient methods, because the corporation could hope to gain but little from any superior efficiency its management might develop.

The producer would doubtless feel that a city corporation, seeking to incur the favor of its city patrons, whose votes granted it a charter and whose representatives regulate its rates, would be a hard bargainer. He would not be inclined to trust the price-making function to a city regulatory board, even if producers, consumers, and dealers were represented.

It has been reported that in Calgary, Canada, much dissatisfaction arose among consumers as a result of concentration of the business in the hands of one company. A large concern with a monopoly of the business would certainly inaugurate numerous money-saving reforms which would not meet with the entire approval of its customers, such for example as the deposit on bottles above mentioned, curtailment of special delivery service, delivery at times convenient to the company, etc., and this would certainly result in a great deal of criticism, at least in the start. In the above instance it was reported [1] that this dissatisfaction went so far as to result in a movement to supply consumers with goats with which to produce their own milk.

Section 4. Coöperation as a Remedy

Four types of coöperation have been proposed: (1) cooperation among dealers, particularly in the delivery of milk; (2) coöperation between grocers and producers; (3) coöperation among consumers; (4) coöperation among producers.

Coöperation among dealers would seem to be a makeshift at best and would not really solve the problem unless it went far enough to be similar to the plan discussed in the preceding section. For one delivery wagon to

[1] International Milk Dealers' Association, Nov., 1917.

carry the milk of various dealers so as to eliminate duplication in delivery would be an almost impossible and certainly a wasteful undertaking, since the dealer assigned to deliver the milk in a particular zone would be required to carry in all sizes of containers milk of all the different dealers having customers in that zone, carrying each in quantity sufficient to meet the fluctuating demands of such consumers.

A plan now being tried in Cleveland, Ohio, provides for coöperation between producers and grocers, the stock in the bottling plant being owned largely by producers and grocers. The aim in this instance is for the coöperatively owned plant to process the milk which is to be sold to the grocery trade, the members of the grocery trade sharing in any reduced costs which may result. The grocers get the milk which they require from the central plant with their own delivery wagons and deliver the milk to the consumers along with their regular grocery deliveries.

Coöperation among consumers is not likely to prove feasible. The consumer has but little interest in milk after all. It is but one of his many interests, and he would hardly devote enough attention to the plan to make consumers' coöperation efficient. There is, however, a successful small consumers' milk company at Ashtabula Harbor, Ohio, which has been in operation for a number of years. This particular plant has, as a rule, sold milk a cent or two under many of the other plants. The stock is owned almost entirely by Finnish laborers and business men, a class of people who have been used to coöperating in their mother country. Practically the same group of people have been successfully operating a coöperative store and a coöperative bakery.

Coöperation among producers is a more feasible plan and one from which better results may be expected than from any of the three already discussed. In fact, as previously shown [1] there is already a considerable nucleus of producers' coöperation in the distribution of milk, particularly in a number of cities of moderate size. This development bids fair to continue and is much more likely to bring good results than coöperation among consumers, since dairymen are as a rule interested mainly in milk production and sale. Furthermore, our city milk zones, aside from the large metropolitan areas, are small enough to permit the producers to keep posted as to what is going on and thus keep in touch with the management of the concern. It is an open question, however, whether producers about most of our large cities could operate efficiently so large and complicated a business as the city milk business. Successful operation of such a business in one of our large cities requires the closest attention of able men who are vitally interested.

Section 5. The Milk Commission and Milk Arbitrator Plans

Another remedy that has frequently been suggested is that of a milk commission. During the war period particularly there were many attempts to fix prices and otherwise regulate the milk business. In the fall and winter of 1917–18 federal milk commissions were appointed in the New England District, the New York City District, the Chicago District, the San Francisco District, and for the State of Ohio.[2] In addition many local commissions were appointed, such for example as those of Detroit, Michigan, and Evansville, Indiana.

[1] Chap. V, Sec. 5.

[2] *Bureau of War Industries Bul. 3*, p. 107.

The aim was to have these commissions composed of capable men, who would represent the various interests and who could arrive at prices fair to producers as well as to consumers. Members of these commissions were, for the most part, persons who were neither producers of nor dealers in milk. In many instances it took these commissions a long time to become familiar with their problems, and many could hardly be said to have gone to the root of these problems before they ceased to exist.

In most cases these commissions sought to arrive at fair prices by securing cost of production figures so far as available and cost of distribution figures as shown by their own accountants. In some cases special cost of production investigations were conducted. As a whole these price tribunals had a difficult task. The Chicago Milk Commission broke up in disagreement over its first report, one member resigning and two issuing minority reports. The New York Commission had great difficulty in bringing any semblance of peace between dealers and producers. The Ohio Commission practically passed out of existence in December, 1918, when the Ohio dairymen refused to abide by its decision and appealed to Food Administrator Croxton for an increase in the price over that allowed by the Commission, which increase was granted. The New England Commission was the only federal commission to function as long as the Food Administration was in control.

One of the most successful commissions was the Detroit Commission. Its success has doubtless been due in large measure to the fact that it accepted as its task the providing of an adequate supply of milk for the city of Detroit. Its work was facilitated by the fact that both producers and dealers had organizations through which collective

bargaining could be carried on, so that it was relatively easy for the Commission to get the two groups together.[1] The personnel of the commission perhaps had something to do with the success in administering its duties.

As an ultimate solution for the milk marketing problem the plan can hardly be expected to measure up to requirements unless the commissions be composed of broad-minded men of considerable ability, with a knowledge of dairy farming and fundamental farm economics and able to give a good share of their time to the problem. First-hand knowledge of the operation of one of these commissions and a study of the reports of others have convinced the writer that a large factor in the failure of the commissions above mentioned to measure up to their opportunities lay in the fact that the men not only failed to grasp the whole situation but that they were too much engrossed with their own everyday affairs to give the problem the attention necessary to master the details sufficiently to make intelligent decisions. Such commissions would perhaps function more satisfactorily if they were to act merely as arbitration boards rather than as price-fixing bodies.

The Wicks Committee in New York recommended that the milk business be declared a public utility and be placed under the control of a competent state department.[2]

Closely related to the commission plan is that of appointing a milk price arbitrator. This plan was in operation in Pennsylvania during the war and proved so satisfactory that it has been continued since the close of the war. The arbitrator "sits in" with representatives of

[1] See Special Bulletin 99, Mich. Agr. College, 1919.

[2] *Prelim. Report of Joint Com. on Dairy Pro., Livestock & Poultry*, p. 578.

the dealers and producers and aids them in coming to an agreement. At the same time his presence gives the public a feeling of confidence in the data presented by either side in substantiation of its claim, and counteracts any feeling on the part of the public that it is being imposed upon whenever prices are increased.[1]

Section 6. The Store or Milk Station as a Solution

The place of the store in our milk distributing system has already been quite fully discussed.[2] Little can be added here except to call attention to the proposal in connection with the other remedies suggested. The store or milk station fills a place, but, as above shown, to attempt to make it perform a function for which it is not at present adapted would increase rather than lessen the evil of duplication in delivery and would therefore not decrease the expense of getting the milk to the consumer. Aside from the doubtful point of greater economy, the store or milk station method, if adopted generally, would lead to more irregular consumption of milk—a change which our dietitians would thoroughly deplore.

Section 7. Zoning of City to Eliminate Duplication

Another proposal is to zone our cities and allot each of the various dealers to particular zones, so as to eliminate duplication. So far as elimination of duplication of delivery service is concerned, this plan would solve the problem, but the public would be far from satisfied to be con-

[1] In the spring of 1920 the Franklin County, Ohio, grand jury, after going into the local milk problem from every angle, recommended that a milk price arbitrator be appointed in the Columbus District.

[2] Chap. IV, Sec. 7.

fined by public or private decree to a single dealer. So long as there are numerous dealers in the business the individuals constituting the public will have preferences and so long will they seek to satisfy those preferences by selecting the dealers of their choice. Doctors and mothers with young children particularly often have strong preferences for the milk of certain dealers. This last point comes to be of importance in connection with the fact that people are constantly moving from one part of a city to another. The zoning scheme strictly adhered to would mean that consumers would have to change milk men every time they moved into a different section of the city.

Legal difficulties would undoubtedly arise if a city sought to compel zoning by restricting given dealers to particular zones, whereas practical difficulties would arise out of the fact that the trade in certain sections of every city is much more desirable than that in other sections.

Frequent reference is made in dairy papers and in our dailies to the alleged fact that zoning has wrought wonders in Philadelphia. In a letter to the writer, Dr. Clyde L. King states that technically the city has not been zoned, but that at his suggestion the dealers are voluntarily working towards that end and at the same time are trying to increase the average size of the loads.[1] He has further stated that a saving of perhaps half a cent a quart would be possible if complete zoning were brought about.[2]

It would seem then, that zoning might offer some saving, but that, on the other hand, it would have some serious disadvantages, and after all it is but a halfway measure and could not, even though it did all that had been

[1] Letter Feb. 15, 1919.

[2] *The Milk Price Situation in Philadelphia*, 1920, p. 18.

claimed for it, go to the root of the real difficulties in the milk business.

Section 8. Collective Bargaining as a Remedy

In many senses collective bargaining can hardly be looked upon as a remedy for many of the problems of milk marketing. On the other hand, with producers properly organized and with producers and dealers once arrived at a recognition of the fact that the whole problem must be approached in a spirit of fairness and broad-mindedness, many of the present difficulties should be overcome. Monthly price contracts, bases of payment, fat tests, can and hauling charges, the surplus, health regulations,—all are problems which can be approached much better if producers and dealers act as units rather than as individuals. Producers themselves have a vital interest at stake in seeing that city prices are not too high, and consumers would ordinarily have little to fear from collusion between producers and dealers. Where such trouble is feared, a price arbitrator or milk commission could readily be introduced to satisfy the public that everything is open and above board.

Not only does collective bargaining appear to be a practical solution for certain phases of the milk problem, but it may be the one adopted of necessity at first, since very few cities will within the next few years be likely to adopt such remedies as milk monopoly or municipal ownership. Even if any of our cities adopt the policy favoring monopoly, greater centralization, or municipalization of the milk supply, collective bargaining will quite certainly develop, since individual producers would be sure to feel aggrieved at various times if compelled to deal with a milk monopoly, whether privately or

publicly owned. Producers would thus feel the desirability, if not the necessity, of being represented by their most capable bargainers.

Much of the discussion in this chapter is based on the assumption that our present system of distribution is extremely wasteful and inefficient and that the plans above discussed and others would remedy existing evils. In the minds of some authorities, however, the evidence thus far presented is not conclusive and in their opinion much may be said on the other side.

CHAPTER VIII

CONCLUSION

The milk business is a business in which the public has a particularly vital interest at stake. Public regulation of all phases of the business is justified, but greater care should be exercised than has been used in the past in imposing regulations upon the business in order not to unnecessarily hamper the production or distribution of the product. Producers themselves are beginning to see that proper regulation is not only the rightful privilege of the consumer but may actually benefit the producer as well.

It would seem to be desirable to encourage a greater degree of concentration in the city milk business, so as to secure any advantages of large-scale operation, reduce duplication to a minimum, make possible the use of the most sanitary methods of handling milk, and facilitate public regulation as to sanitary conditions and quality.

The wastefulness of the competitive system in the milk business is undoubtedly very great, but probably no greater than in many other lines of endeavor. Cost of retail distribution could undoubtedly be reduced one or two cents per quart if the business could be centralized, provided it were conducted as efficiently as are the more efficient privately operated concerns to-day.

Municipal ownership and operation, regulated private monopoly, coöperation by producers or consumers, zoning, the milk commission or milk arbitrator plans,—all offer

but partial remedies. All have disadvantages and all would depend for their successful operation upon a saner, more businesslike, and less selfish sort of action than is usually displayed by those in charge of our city governments or of the various organized interests.

The most feasible remedy for the present appears to be a combination of collective bargaining and the milk commission or milk arbitrator plan. The main difficulty would appear to be that of getting men appointed who would be able to hold the confidence of all three parties—producers, dealers, and consumers. Such commissions, if that plan were adopted, should perhaps be state commissions, similar, in some respects, to the commissions which control our public utilities. Such bodies should be non-political, and the members should be appointed for rather long terms, expiring at different times.

The surplus problem has been a perplexing one. No easy solution appears to be available. For some plants there is no real surplus. They can use all the milk they can buy—but only if they can buy it at lower prices, for a part of it must go into uses which are largely supplied by cheaper milk, produced in the summer months on cheaper land, and with somewhat less labor and equipment than is usually required for city milk production. One solution which appears to be feasible is that of determining the amount of the surplus and then basing payment for it upon the market prices of certain manufactured products, usually butter or cheese, with an allowance for skim milk. Another method of solving the problem, more particularly where dealers are not already handling it economically, is for the producers to convert the surplus into the various dairy products in plants owned and operated by themselves.

Price determination has been the center of much contention in the past and will doubtless continue to be troublesome. No easy solution has been found. Cost of production formulæ, basic market quotation arrangements of various kinds, all appear to be useful only as starting points in arriving at price at a given time. With the right kind of collective bargaining, with the recognition of the limits of cost of production figures as factors in price determination, and with a clearer understanding of the conditions of supply and demand, which after all determine price at any given time, the problem should be less troublesome in the future than in the past.

Collective bargaining among producers is here to stay. In general it will be beneficial to both producer and consumer, particularly if it succeeds in reducing marketing costs in any way. Producers are often inclined to expect too much from their organizations along the lines of securing price increases, and consumers, to about the same extent, fear these organizations and look upon them as "milk trusts." Some sort of protection should probably be provided to protect consumers against attempts at monopolistic practices. So long, however, as farmers in and about the milk sheds of our cities are free to enter or leave the field of milk production with relative ease, as at present, and so long as a large proportion of our milk goes into the manufacture of the various dairy products, no producers' organization can hope unduly to affect prices of milk for long. Consumers need therefore have little fear of a "farmers' milk trust," for such a thing is practically impossible.

The milk marketing problem cannot be solved so long as the triangular warfare between producers, dealers, and consumers continues. What is needed is a better under-

standing all around, a greater spirit of frankness, a recognition by each that the others have rights that are to be respected; that each group is composed of human beings actuated by the same human impulses; and that all can gain by coöperation and mutual understanding.

APPENDIX A

REGULATION 13 FROM NEW YORK SANITARY CODE

Regulation 13. Designations of Milk and Cream Restricted

ALL milk sold and offered for sale at retail, except milk sold or offered for sale as sour milk under its various designations, shall bear one of the designations provided in this regulation, which constitute the minimum requirements permitted in this state.

No term shall be used to designate the grade or quality of milk or cream which is sold or offered for sale, except:

"Certified"
"Grade A raw"
"Grade A pasteurized"
"Grade B raw"
"Grade B pasteurized"
"Grade C raw"
"Grade C pasteurized"

Certified: No milk or cream shall be sold or offered for sale as "certified" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the local health officer.

All cows producing such milk or cream must have been tested at least once during the previous year with tuberculin, and any cow reacting thereto must have been promptly excluded from the herd. The reports of such tuberculin tests must be filed with the local health officer and the milk commission of the county medical society in the municipality and county respectively in which such milk is delivered to the consumer.

Such milk must not at any time previous to delivery to the consumer contain more than 10,000 bacteria per cubic centi-

meter and such cream not more than 50,000 bacteria per cubic centimeter.

Such milk and cream must be produced on farms which are duly scored on the scorecard prescribed by the state commissioner of health, not less than thirty-five per cent for equipment and not less than fifty-five per cent for methods.

Such milk and cream must be delivered within thirty-six hours of the time of milking.

Such milk and cream must be delivered to consumers only in containers filled at the dairy or central bottling plant.

The caps must contain the word "Certified" and bear the certification of a milk commission appointed by the county medical society organized under and chartered by the medical society of the state of New York, and must also contain the name and address of the dairy as well as the date of milking.

Every employee before entering upon the performance of his duties shall be examined by a duly licensed physician and the reports of such examination shall be sent to the milk commission certifying the milk from such dairy.

The milkers and all persons handling the milk must be provided with suits and caps of washable material which shall be worn while milking or handling the milk and shall not be worn at other times. When not in use these garments must be kept in a clean place free from dust. Not less than two clean suits and caps must be furnished weekly. The hands of the milkers must be washed with soap and hot water, and well dried with a clean towel, before milking.

Grade A raw. No milk or cream shall be sold or offered for sale as "Grade A raw" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the local health officer.

All cows producing such milk or cream must have been tested at least once during the previous year with tuberculin, and any cow reacting thereto must have been promptly excluded from the herd.

Such milk must not at any time previous to delivery to the consumer contain more than 60,000 bacteria per cubic centimeter, and such cream not more than 300,000 bacteria per cubic centimeter.

Such milk and cream must be produced on farms which are duly scored on the scorecard prescribed by the state commissioner of health not less than twenty-five per cent for equipment, and not less than fifty per cent for methods.

Such milk and cream must be delivered within thirty-six hours from the time of milking, unless a shorter time shall be prescribed by the local health authorities.

Such milk and cream must be delivered to consumers only in containers sealed at the dairy or a bottling plant. The caps or tags must be white and contain the term "Grade A raw" in large black type, and the name and address of the dealer.

Grade A pasteurized. No milk or cream shall be sold or offered for sale as "Grade A pasteurized" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the local health officer.

All cows producing such milk or cream must be healthy as disclosed by an annual physical examination.

Such milk or cream before pasteurization must not contain more than 200,000 bacteria per cubic centimeter.

Such milk must not at any time after pasteurization and previous to delivery to the consumer contain more than 30,000 bacteria per cubic centimeter, and such cream not more than 150,000 bacteria per cubic centimeter.

Such milk and cream must be produced on farms which are duly scored on the scorecard prescribed by the state commissioner of health not less than twenty-five per cent for equipment and not less than forty-three per cent for methods.

Such milk and cream must be delivered within thirty-six hours after pasteurization, unless a shorter time shall be prescribed by the local health authorities.

Such milk and cream must be delivered to consumers only

in containers sealed at the dairy or at a bottling plant. The caps or tags must be white and contain the term "Grade A pasteurized" in large black type.

Grade B raw. No milk or cream shall be sold or offered for sale as "Grade B raw" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the local health officer.

All cows producing such milk or cream must be healthy as disclosed by an annual physical examination.

Such milk must not at any time previous to delivery to the consumer contain more than 200,000 bacteria per cubic centimeter, and such cream not more than 750,000 bacteria per cubic centimeter.

Such milk and cream must be produced on farms which are duly scored on the scorecard prescribed by the state commissioner of health not less than twenty-three per cent for equipment and not less than thirty-seven per cent for methods.

Such milk and cream must be delivered within thirty-six hours from the time of milking, unless a shorter time shall be prescribed by the local health authorities.

The caps or tags on the containers must be white and contain the term "Grade B raw" in large, bright green type, and the name of the dealer.

Grade B pasteurized. No milk or cream shall be sold or offered for sale as "Grade B pasteurized" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the local health officer.

All cows producing such milk or cream must be healthy as disclosed by an annual physical examination.

Such milk or cream before pasteurization must not contain more than 1,500,000 bacteria per cubic centimeter.

Such milk must not at any time after pasteurization and previous to delivery to the consumer contain more than 100,000

bacteria per cubic centimeter, and such cream not more than 500,000 bacteria per cubic centimeter.

Such milk and cream must be produced on farms which are duly scored on the scorecard prescribed by the state commissioner of health not less than twenty per cent for equipment and not less than thirty-five per cent for methods.

Such milk must be delivered within thirty-six hours, and such cream within forty-eight hours after pasteurization, unless a shorter time is prescribed by the local health authorities.

The caps or tags on the containers must be white and contain the term "Grade B pasteurized" in large, bright green type, and the name of the dealer.

The provisions of this subdivision shall take effect throughout the state of New York, except in the city of New York, on the first day of January, 1916.

Grade C raw. No milk or cream shall be sold or offered for sale as "Grade C raw" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the local health officer.

Such milk and cream must be produced on farms which are duly scored on the scorecard prescribed by the state commissioner of health not less than forty per cent.

Such milk and cream must be delivered within forty-eight hours from the time of milking, unless a shorter time shall be prescribed by the local health authorities.

The caps or tags affixed to the containers must be white and contain the term "Grade C raw" in large red type.

Grade C pasteurized. No milk or cream shall be sold or offered for sale as "Grade C pasteurized" unless it conforms to the following requirements:

The dealer selling or delivering such milk or cream must hold a permit from the local health officer.

Such milk and cream must be produced on farms which are duly scored on the scorecard prescribed by the state commissioner of health not less than forty per cent.

Such milk and cream must be delivered within forty-eight hours after pasteurization, unless a shorter time shall be prescribed by the local health authorities.

The caps or tags affixed to the containers must be white and contain the term "Grade C pasteurized" in large red type.

The bacterial count herein required shall be made only at county or municipal laboratories or such other laboratories as may be approved by the state commissioner of health.

In those municipalities where a bacterial count of the milk is, in the opinion of the local health authorities, impracticable, they may in their discretion grade milk and cream according to the scroe of the dairies producing it, as prescribed in this regulation, but no such milk shall be designated "certified," "Grade A raw," or "Grade A pasteurized."

This regulation shall not be construed to rescind or modify any existing local regulation or ordinance controlling the grading of milk or cream established prior to the first day of September, 1914.

This regulation as amended shall take effect March 15, 1918.

APPENDIX B

SOME PROBLEMS ARISING OUT OF THE MARKETING OF MILK ON A BUTTERFAT BASIS

The Butterfat Content as a Basis for the Sale of Whole Milk

SINCE 1892, when the Babcock tester was invented, the butter-fat content of milk has gradually come to be recognized as the most important single factor to be considered in establishing the grade of milk. While butterfat content is not the only index of value, it is an index which cannot, in fairness, be neglected. There are at least three distinct reasons why milk should be bought on the basis of butterfat content:

1. The food value—in heat or energy units—differs widely in milks of different fat contents, and varies directly, though not in the same proportion, as the fat content varies.

2. It costs more to produce milk high in fat than it does to produce low-testing milk.

3. Actual market values on an open competitive market are always higher for high-testing milk than for milk with a low test.

In practice, however, the purchase of milk on the basis of butterfat content is attended with difficulties which have retarded its adoption in many communities, so that even to-day in such places milk is bought without reference to fat content, so long as it complies with legal requirements. The principal difficulties with the adoption of the butterfat content as a basis for the marketing of milk have been: (1) On the part of the producer, a lack of knowledge as to how the test was made and uncertainty—often well-founded—as to the accuracy of the tests; (2) on the part of the dealer, the added expense of making the test, and the trouble in satisfying producers as to the cor-

rectness of tests. Even where the principle has been accepted, the methods of adjusting prices on the butterfat basis have not been uniformly fair to all concerned.

The adjustment of prices according to butterfat content has usually been done by quoting a definite price per hundredweight for milk of a given basic test, and then adding a few cents to the price per hundredweight for each additional tenth of one per cent of butterfat (each tenth of one per cent representing one-tenth of a pound of butter in one hundredweight of milk) or deducting the same amount for each tenth of one per cent below the basic test. This base has most usually been a given test—as 3.5 per cent—though in many instances a broader base has been used—3.3 to 3.7 per cent, for example. The former is the more desirable. This base should be established by taking the average of a number of tests made during the month.

The differential—the premium or penalty allowed for each "point" or tenth of a per cent above or below the base—has usually been fairly near the price of butterfat. In Chicago for a number of years it was three cents. In other places it has been 2½ cents or 3 cents. During the years 1912 to 1914, inclusive, prices of butter at Chicago varied from 24 to 40 cents per pound, with the average close to 30 cents, so that the value of an extra pound of butterfat in milk over a given standard has about equalled its commercial value, though only approximately so. In numerous cases the low differential has been retained even with unusually high prices for milk.

It is obviously unfair to the producer of high-testing milk to pay him no more than is paid the producer of low-testing milk. But just how much more he should be paid is not so easily answered. On the question of cost of production we are completely in the dark. It is known, for example, that it costs more to produce the richer milk. No definite data are available, however, to show the relative costs of producing 3.5 per cent or 4.5 per cent milk. We must therefore fall back on market values.

Two sets of questions arise in any consideration of the use of the butterfat content as a basis for the grading of milk:

1. As regards the proper differential:
   a. What is the effect of too high or too low a differential on
      (1) The producer
      (2) The distributor
      (3) The character of the milk supply?
   b. Should a difference be made in the amount of the differential when it constitutes respectively a penalty and a premium?
   c. How can one at any given time arrive at the proper differential?
2. As regards the proper basic test:
   a. Does a low or a high basic test, as such, have any influence on the quality of milk produced for a given market?
   b. Is there any disadvantage in the fact that different communities have different basic tests?
   c. Is any given basic test more desirable than any other?

Before taking up these questions it should be pointed out that this discussion is not at all concerned with milk prices as compared with prices of other commodities, but is concerned only with the relative fairness of prices paid for milks of different degrees of richness in fat. For example, it is not the question of whether the price should be $2.50 or $4.00 per hundredweight, but rather what should be the price of 3 per cent milk or 5 per cent milk when 4 per cent milk is of a given price.

Again, this discussion is not concerned with the question of prices in one city as compared with those in another, but is concerned with the question of whether or not it matters to producer, distributor, or consumer, whether the price is quoted on the low-testing milk, on the high-testing milk, or on some intermediate grade.

Let us take up first the questions regarding the differential.

What is the effect on the producer of a high or a low differential? Compare, for example, three producers producing respectively milk testing 3 per cent, 4 per cent, and 5 per cent. Suppose the price of 4 per cent milk is $2.80 per hundredweight, with a differential of 3 cents. The man producing 4 per cent milk gets the quoted price. The 3 per cent man then gets 30 cents less and the 5 per cent man 30 cents more than the 4 per cent man. What does each of the three get for the fat in his milk? The answer depends upon the value assigned to the skim milk. At present prices of grains, the skim milk in 100 pounds of whole milk should be worth between 50 cents and $1.00. Assuming 80 cents as the value of the skim milk, we have $2.00 as the value of the four pounds of fat in the 4 per cent milk, or 50 cents per pound. But on the same basis the 3 per cent man gets 53 cents and the 5 per cent man but 48 cents for each pound of fat in his milk. The low differential here penalizes the producer of the 5 per cent milk.

Turning to Table I, lines 7, 8, and 9, columns 6 and 7, we find that had the differential been 5 cents, each producer would have received 50 cents for each pound of butterfat, again assuming skim milk worth 80 cents for the amount in 1 hundredweight of whole milk. Columns 10 and 11 on the same lines show that a 7 cent differential would penalize the producer of 3 per cent milk. To summarize:

	3¢ Differential		*5¢ Differential*		*7¢ Differential*	
	Price per cwt.	*Av. value each lb. of fat*	*Price per cwt.*	*Av. value each lb. of fat*	*Price per cwt.*	*Av. value each lb. of fat*
Calculated price, 3% milk.	$2.50	$.566	$2.30	$.50	$2.10	$.433
Quoted price, 4% milk....	2.80	.50	2.80	.50	2.80	.50
Calculated price, 5% milk.	3.10	.46	3.30	.50	3.50	.54

How does the differential affect the dealer? If the basic test on which prices are quoted coincides with the actual test

of the total volume of milk reaching the vats of the dealers, the differential does not concern him at all. If, however, he is buying milk testing on the average 4.5 per cent and selling a product testing 4 per cent, he is interested in having the differential as low as he can get it. At any rate, if he standardizes at all, he cannot afford to have it higher than the price of butterfat in sweet cream.

The character of the milk supply is affected by the differential to the extent that too low a differential or no differential will tend to drive the high-testing cows out of business or to induce farmers to remove some of the fat before shipping the milk. Too high a differential may tend to bring on a supply of milk richer than the consumer cares to buy, for the latter does not ordinarily seem willing to pay for a great amount of extra fat in milk.

Taking up the second question, that of whether a difference should be made in the amount of the differential when it constitutes respectively a penalty and a premium, it would seem that there is no reason for making such a difference if the differential is properly adjusted.

How can we at any given time arrive at the proper differential? In normal times the simplest and best method is that of following fairly closely the price of butterfat in sweet cream, which is usually a few cents over the butter market. If milk prices always closely approximated the combined value of the skim and butterfat content, the price problem would be easy of solution; but milk prices usually fluctuate more widely than do butterfat prices, since butterfat can be and is regularly stored in flush seasons. Milk prices cannot go below a price equal to the sum of the values of the skim milk and butterfat content. They may go much above. When they do go above such values, the following is suggested as a method of arriving at a differential which is fair to both the producer of 3 per cent and of 5 per cent milk, and not unfair to the distributor so long as he is not buying the milk for a lower use than the one which brought about the high prices:

1. Determine the approximate value of skim milk.
2. Determine the basic price of milk.
3. Deduct the value of the skim milk in one hundredweight of whole milk from the basic price per hundredweight.
4. Divide the remainder by the basic test. One-tenth of the quotient will then give a differential which would be fair to all.

To illustrate: The present price of whole milk testing 4 per cent is $3.60 per hundredweight. If the value of the skim in that amount of whole milk is 80 cents, then $2.80 represents the value of the four pounds of butterfat. Two dollars and eighty cents divided by 4 equals 70 cents, one-tenth of which would be a fair differential. The table on p. 283 carries this illustration still farther. It compares 4 per cent milk at various prices per hundredweight and with various differentials with 3 per cent milk and 5 per cent milk. Assuming that the skim milk is worth the same in the various milks (which is approximately correct), it shows, for example, that when 4 per cent milk sells at $2.00 and butterfat is at 30 cents, a differential of 3 cents would be fair to producers of other grades; but a differential of 7 cents would give the man with 3 per cent milk but 16.7 cents per pound for the fat content, while the man with 5 per cent milk would get 38 cents per pound of fat.

It has frequently been suggested that the basic test should be uniform throughout the state. At present Cleveland, for example, has a basic test of 3.5 per cent, whereas at Columbus the basic test is 4 per cent. What are the advantages or disadvantages of making the Columbus basis 3.5 per cent? Producers are advocating such a change, dealers opposing it.

Would a high or a low basic test have any influence on the quality of the milk reaching the Columbus market? A careful study of the accompanying table will show that so long as the differential is so adjusted as not to penalize the producer of one grade of milk as compared with the producer of some other grade, the quality of milk coming to the city will not be influenced at all by the selection of any particular basic test. It may be, however, that with payment regularly made on a butter-

fat basis, dealers will try to buy from the producers of low-testing milk, and thus reduce the quality of the milk received. But this would not be contingent on the particular basic test used in quoting prices.

TABLE I

The Operation of Given Differentials with Comparisons on 4% Base

Value of 1 lb. butterfat in whole milk, assuming value of skim 80¢ for the amount in 100 lbs. of whole milk

Test	*Differential for each 1% of test over or under base*									
	3¢		*4¢*		*5¢*		*6¢*		*7¢*	
	Price per cwt.	*Av. value per lb. fat*	*Price per cwt.*	*Av. value per lb. fat*	*Price per cwt.*	*Av. value per lb. fat*	*Price per cwt.*	*Av. value per lb. fat*	*Price per cwt.*	*Av. value per lb. fat*
3%	$1.70	$.30	$1.60	$.267	$1.50	$.233	$1.40	$.20	$1.30	$.167
4%	2.00	.30	2.00	.30	2.00	.30	2.00	.30	2.00	.30
5%	2.30	.30	2.40	.37	2.50	.34	2.60	.36	2.70	.38
3%	2.10	.433	2.00	.40	1.90	.366	1.80	.333	1.70	.30
4%	2.40	.40	2.40	.40	2.40	.40	2.40	.40	2.40	.40
5%	2.70	.38	2.80	.40	2.90	.42	3.00	.44	3.10	.46
3%	2.50	.566	2.40	.533	2.30	.50	2.20	.466	2.10	.433
4%	2.80	.50	2.80	.50	2.80	.50	2.80	.50	2.80	.50
5%	3.10	.46	3.20	.48	3.30	.50	3.40	.52	3.50	.54
3%	2.90	.70	2.80	.666	2.70	.633	2.60	.60	2.50	.566
4%	3.20	.60	3.20	.60	3.20	.60	3.20	.60	3.20	.60
5%	3.50	.54	3.60	.56	3.70	.58	3.80	.60	3.90	.62
3%	3.30	.833	3.20	.80	3.50	.766	3.00	.733	2.90	.70
4%	3.60	.70	3.60	.70	3.60	.70	3.60	.70	3.60	.70
5%	3.90	.62	4.00	.64	4.10	.66	4.20	.68	4.30	.70

Again, if dealers regularly sell milk testing, for example, on an average 4 per cent, while quoting prices on the basis of 3.5 per cent milk, their margin of gross profit will appear to be wider than it actually is.

Is there any disadvantage in the fact that different com-

munities have different basic tests? At least one disadvantage at once presents itself. In the marketing of any agricultural product it is desirable to have quotations in different communities on the same basis, so that buyers and sellers may the more readily compare values on the different markets. It is the opinion of the writer that in this case also it would be advantageous to producers, at least, to have quotations in all parts of the country based upon the same grade of milk.

In view of the points above considered, it appears that:

1. The differential allowed for variations from the basic test should follow the prices of butterfat in sweet cream, or at any rate should not be below the current wholesale quotation for butter of the higher grades.
2. The basic test should correspond as closely as possible with the test of the major portion of the milk sold.

APPENDIX C

THE DAIRYMEN'S CO-OPERATIVE SALES COMPANY

.....Local Branch, County.....State.....
Contract of.....P. O. Address.....
Present Buyer.....Address.....

Product at present { Deliver receiving station at.....Estimated winter production..... / Ship independently to..... / Sold locally in.....Estimated summer production..... }

(Cross out all but the correct statement)

THIS AGREEMENT, made this.....day of..... 19.., by and between THE DAIRYMEN'S CO-OPERATIVE SALES COMPANY, organized under the laws of the State of Ohio, party of the first part, and.....
of the Township of.....County of.....State of..... party of the second part.

WITNESSETH: That in consideration of the sum of ONE DOLLAR ($1.00), paid by the party of the first part to party of second part, the receipt whereof is hereby acknowledged, and of the covenants and agreements herein contained, the said parties have agreed and do hereby agree as follows:

1. Party of the second part agrees to subscribe for one-tenth share of the capital stock of the said party of the first part for each cow owned or kept by said second party (with a minimum subscription of one share and one-tenth share for each additional cow owned above ten cows) and does hereby subscribe for.....shares of such capital stock, each share of the par value of $2.50 which sum he agrees to pay in cash on the execution of this agreement for each share of stock and fraction thereof as subscribed by him, viz:..... Dollars ($.....); and the Secretary for the time being of said Company is hereby authorized to sign the name of the second party to the original stock subscription book of said Company for the said number of shares.

2. That the party of the second part hereby agrees to consign and hereby does consign to party of the first part for sale all the milk and cream produced upon any farm controlled by party of the second part, except such milk as is required for home, farm or local consumption, for and during the term beginning..... .....to....., and thereafter for six months periods, unless 60 days' notice is given in writing by either party before the expiration of any contract period, and the party of the second part further agrees to maintain his

dairies, barns and all equipment and utensils used in producing milk and cream in conformity to the sanitary requirements of the State, county, district, or municipality where said milk and cream shall be sold, and agrees to deliver said milk and cream pure and unadulterated to the shipping station, condensary, or such other manufacturing plant as is designated by the party of the first part, or if party of the first part should be unable to dispose of the said milk during any portion of said period, party of the second part shall be so notified and in such an emergency it shall be optional with party of the second part whether they manufacture their products at home or at a place provided and operated by the party of the first part.

3. The party of the first part agrees to sell and dispose of the said milk or cream to the best advantage for account of and to a buyer or buyers approved by and satisfactory to the party of the second part.

4. IT IS FURTHER AGREED that the party of the first shall receive a commission from the proceeds of the sale not to exceed one per cent of the selling price thereof during the period of this contract, and the said commission shall be deducted from the proceeds of such sales.

5. IT IS MUTUALLY COVENANTED AND AGREED that in case either party fails to perform the covenants herein agreed to be performed by such party, the party so failing shall and will pay to the other the sum of Five Dollars ($5.00) per cow for.....cows for which party of the second part has taken stock, which sum is hereby fixed and agreed upon as the liquidated damage for such failure, and that the same shall in no event be considered a penalty.

IN WITNESS WHEREOF the parties to these presents have hereunto set their hands and seals, the day and year first above written.

THE DAIRYMEN'S CO-OPERATIVE SALES COMPANY,

By.....Pres.

Attest:.....Sec'y.

Stockholder sign below.

.....(L. S.)

Signed, sealed and delivered in the presence of

.....
.....
} Witnesses for Stockholder.

APPENDIX D

PRICES OF MILK AND OTHER COMMODITIES

Wholesale Milk Prices

Average Ten [1] *Cities*	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$1.90	$1.86	$1.79	$1.70	$1.52	$1.49	$1.60	$1.71	$1.78	$1.94	$1.98	$2.00
1914	1.96	1.93	1.88	1.69	1.54	1.50	1.62	1.70	1.78	1.93	1.96	1.97
1915	1.95	1.89	1.86	1.64	1.49	1.50	1.61	1.68	1.76	1.87	1.93	1.95
1916	1.91	1.89	1.84	1.68	1.58	1.53	1.67	1.77	1.91	2.09	2.22	2.25
1917	2.26	2.22	2.19	2.19	2.17	2.08	2.39	2.55	2.66	3.03	3.24	3.40
1918	3.56	3.52	3.45	3.12	2.83	2.66	2.82	3.26	3.57	3.82	4.07	4.23
1919	4.07	3.85	3.51	3.38	3.35	3.24	3.45	3.80	3.88	4.01	4.07	4.16
Relative [2] *Price Ten Cities*												
1913	107	105	101	96	86	84	90	96	100	109	112	113
1914	110	109	106	95	87	85	91	96	100	108	111	111
1915	110	107	105	92	84	85	91	95	99	105	109	110
1916	108	106	104	95	89	87	94	100	107	117	125	126
1917	127	125	123	123	122	117	134	143	150	170	182	191
1918	200	197	194	175	159	149	159	183	200	214	228	237
1919	228	216	197	189	188	182	193	213	217	225	228	233

[1] Milwaukee, Chicago, New Orleans, Pittsburg, Philadelphia, San Francisco, Detroit, Baltimore, New York, Cleveland.

[2] Base = 100 = Average, 1913.

Wholesale Milk Prices—Continued

Milwaukee [1]	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1904	....	....	....	....	$1.24	$1.24	$1.24	$1.24	$1.24	$1.24	$1.38	$1.45
1905	$1.45	$1.45	$1.45	$1.31	1.24	1.24	1.24	1.24	1.24	1.31	1.45	1.45
1906	1.45	1.45	1.45	1.31	1.24	1.24	1.24	1.31	1.31	1.45	1.45	1.45
1907	1.45	1.45	1.45	1.38	1.16	1.16	1.16	1.45	1.45	1.74	1.74	1.74
1908	1.74	1.67	1.53	1.45	1.31	1.31	1.45	1.45	1.45	1.60	1.60	1.67
1909	1.60	1.60	1.53	1.45	1.38	1.38	1.38	1.45	1.45	1.67	1.74	1.74
1910	1.74	1.60	1.60	1.53	1.31	1.31	1.60	1.60	1.67	1.96	2.03	1.96
1911	1.82	1.82	1.60	1.53	1.31	1.31	1.53	1.67	1.83	1.83	1.83	1.83
1912	1.67	1.67	1.60	1.53	1.45	1.31	1.60	1.89	1.89	1.89	1.89	1.89
1913	1.89	1.89	1.82	1.82	1.46	1.45	1.60	1.89	1.89	1.96	1.96	1.96
1914	1.89	1.89	1.82	1.82	1.60	1.53	1.60	1.89	1.89	1.96	1.89	1.89
1915	1.89	1.67	1.60	1.60	1.46	1.45	1.53	1.67	1.74	1.74	1.74	1.74
1916	1.82	1.74	1.67	1.60	1.45	1.46	1.82	1.96	2.03	2.04	2.18	2.33
1917	2.18	2.18	2.18	2.40	2.04	1.74	2.40	2.40	2.47	3.20	3.27	3.34
1918	3.34	3.34	3.27	2.69	2.25	2.03	2.54	3.05	3.27	3.63	4.00	4.14
1919	4.07	3.68	3.32	3.15	3.10	2.99	3.43	4.00	4.00	4.00	4.00	3.92

[1] Can price calculated to cwt. price. No allowance for fat.

Wholesale Milk Prices—Continued

Milwaukee [1] *Relative Price*	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	105	105	101	101	81	81	89	105	105	109	109	109
1914	105	105	101	101	89	85	89	105	105	109	105	105
1915	105	93	89	89	81	81	85	93	97	97	97	97
1916	101	97	93	89	81	81	101	109	113	113	121	129
1917	121	121	121	133	113	97	133	133	137	178	182	186
1918	186	186	182	150	125	113	141	170	182	202	222	230
1919	226	204	185	175	167	166	191	222	222	222	222	218
San Francisco [2]												
1913	$1.86	$1.86	$1.86	$1.86	$1.86	$2.04	$2.03	$2.04	$2.03	$2.04	$2.03	$2.04
1914	2.04	2.03	2.04	2.03	2.04	1.92	1.92	1.92	1.92	1.92	1.92	1.92
1915	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92
1916	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92
1917	1.92	1.92	1.92	1.92	1.92	2.18	2.18	2.18	2.91	2.91	2.91	2.91
1918	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.61	3.60	3.61	3.59
1919	3.58	3.58	3.58	3.58	3.58	3.58	3.57	3.57	3.57	3.57	3.57	3.80

[1] Base = 100 = Average, 1913.

[2] F. O. B. City.

Wholesale Milk Prices—Continued.

New Orleans	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$2.00	$2.00	$2.00	$1.80	$1.80	$1.80	$1.80	$1.80	$1.80	$2.00	$2.00	$2.00
1914	2.00	2.00	2.00	1.80	1.80	1.80	1.80	1.80	1.80	2.00	2.00	2.00
1915	2.00	2.00	2.00	1.80	1.80	1.80	1.80	1.80	1.80	2.00	2.00	2.00
1916	2.00	2.00	2.00	1.80	1.80	1.80	1.80	1.80	1.80	2.00	2.20	2.20
1917	2.20	2.20	2.20	2.00	2.40	2.40	2.40	2.40	2.40	3.72	3.72	4.19
1918	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.19	4.54	4.54	4.54
1919	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	5.34	5.34	5.34
Relative[1] *Price*												
1913	105	105	105	95	95	95	95	95	95	105	105	105
1914	105	105	105	95	95	95	95	95	95	105	105	105
1915	105	105	105	95	95	95	95	95	95	105	105	105
1916	105	105	105	95	95	95	95	95	95	105	117	117
1917	117	117	117	105	126	126	126	126	126	196	196	220
1918	220	220	220	220	220	220	220	220	220	239	239	239
1919	239	239	239	239	239	239	239	239	239	281	281	281

[1] Base = 100 = Average, 1913.

Wholesale Milk Prices—Continued

Pittsburgh [1]	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$1.75	$1.65	$1.55	$1.45	$1.35	$1.15	$1.35	$1.35	$1.55	$1.80	$1.85	$1.90
1914	1.90	1.80	1.70	1.60	1.30	1.30	1.40	1.50	1.70	1.75	1.80	1.85
1915	1.85	1.75	1.65	1.50	1.20	1.30	1.40	1.50	1.60	1.65	1.75	1.85
1916	1.85	1.75	1.65	1.65	1.45	1.35	1.45	1.60	1.75	2.00	2.23	2.22
1917	2.23	2.17	2.18	2.17	2.69	2.34	2.34	2.05	2.05	2.05	3.30	3.45
1918	3.53	3.60	3.60	2.90	2.50	2.30	2.45	3.00	3.45	3.50	4.05	4.25
1919	4.05	3.75	3.25	3.25	3.25	2.65	2.90	3.50	3.50	3.85	4.00	4.25
Relative [2] *Price*												
1913	112	106	100	93	87	74	87	87	100	115	119	122
1914	122	116	109	103	83	83	90	96	109	112	116	119
1915	119	112	106	96	77	83	90	96	103	106	112	119
1916	119	112	106	106	93	87	93	103	112	128	143	143
1917	143	140	140	140	172	150	150	132	132	132	212	221
1918	226	231	231	186	160	148	157	192	221	225	260	273
1919	260	241	209	209	209	170	186	225	225	247	257	273

[1] Country price, 4 per cent milk.

[2] Base=100=Average, 1913.

Wholesale Milk Prices—Continued

Philadelphia [1]	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$2.09	$1.86	$1.86	$2.09	$1.63	$1.63	$1.63	$1.86	$1.86	$2.09	$2.09	$2.09
1914	2.09	2.09	2.12	1.98	1.86	1.86	1.86	1.86	1.86	2.09	2.09	2.09
1915	2.09	2.09	2.09	1.86	1.86	1.86	1.86	1.86	1.86	2.09	2.09	2.09
1916	2.09	2.09	2.09	1.86	1.86	1.86	1.86	1.86	2.33	2.33	2.56	2.56
1917	2.56	2.56	2.56	2.56	2.56	2.56	3.26	3.26	3.26	3.26	3.61	3.61
1918	4.30	4.07	4.07	3.61	3.14	3.14	3.37	3.61	3.96	4.36	4.65	4.88
1919	4.42	4.34	3.95	3.72	3.72	3.72	3.72	4.19	4.19	4.19	4.19	4.19
Relative [2] *Price*												
1913	110	98	98	110	86	86	86	98	98	110	110	110
1914	110	110	112	104	98	98	98	98	98	110	110	110
1915	110	110	110	98	98	98	98	98	98	110	110	110
1916	110	110	110	98	98	98	98	98	123	122	135	135
1917	135	135	135	135	135	135	171	172	171	172	190	190
1918	227	214	214	190	165	165	178	190	208	230	245	257
1919	233	228	208	196	196	196	196	221	220	221	220	221

[1] F. O. B. City.

[2] Base = 100 = Average, 1913.

Wholesale Milk Prices—Continued

New York [1] *Price Qt.*	*Jan.* *Cts.*	*Feb.* *Cts.*	*Mar.* *Cts.*	*Apr.* *Cts.*	*May* *Cts.*	*June* *Cts.*	*July* *Cts.*	*Aug.* *Cts.*	*Sept.* *Cts.*	*Oct.* *Cts.*	*Nov.* *Cts.*	*Dec.* *Cts.*
1899	2.75	2.50	2.50	2.25	2.12	2.00	2.17	2.25	2.50	2.85	3.25	3.25
1900	3.00	3.00	2.75	2.50	2.29	2.25	2.44	2.63	2.75	3.00	3.00	3.25
1901	3.00	2.75	2.63	2.50	2.12	2.00	2.25	2.36	2.50	2.75	3.08	3.50
1902	3.38	3.25	3.04	2.87	2.63	2.25	2.25	2.42	2.50	3.00	3.25	3.75
1903	3.50	3.50	3.31	3.12	2.65	2.36	2.25	2.25	2.58	2.84	3.00	3.25
1904	3.12	3.00	3.00	2.75	2.37	2.00	2.09	2.25	2.50	2.88	3.32	3.75
1905	3.50	3.38	3.12	2.83	2.56	2.00	2.38	2.50	2.75	3.00	3.17	3.50
1906	3.50	3.43	3.12	2.87	2.58	2.25	2.34	2.66	2.90	3.25	3.50	3.75
1907	3.75	3.50	3.25	3.25	2.87	2.50	2.63	3.09	3.38	4.00	4.00	4.00
1908	4.00	3.75	3.50	3.12	2.62	2.25	2.50	3.00	3.13	3.75	3.83	4.00
1909	3.91	3.63	3.50	3.12	2.67	2.25	2.75	3.13	3.50	3.75	4.05	4.25
1910	4.12	4.00	3.75	3.58	3.00	3.00	3.26	3.50	3.67	4.00	4.00	4.25
1911	3.91	3.75	3.25	2.88	2.75	2.50	2.85	3.13	3.25	3.75	4.09	4.25
1912	4.25	4.13	3.75	3.50	3.25	3.00	3.26	3.50	3.50	3.75	4.00	4.25
1913	3.75	3.75	3.50	3.33	3.00	2.75	3.00	3.50	3.75	4.00	4.04	4.04
1914	4.00	3.75	3.50	3.25	2.66	2.75	3.00	3.25	3.50	4.00	4.25	4.25
1915	4.13	3.93	3.75	3.25	2.75	2.75	3.00	3.25	3.50	3.75	4.25	4.25
1916	4.12	4.00	3.75	3.25	3.00	2.75	3.13	3.50	3.65	5.00	5.23	5.22
1917	5.12	5.00	4.90	4.88	4.77	4.55	4.97	5.95	5.95	7.17	7.70	7.17
1918	8.08	7.70	7.45	5.90	5.82	4.42	5.38	6.32	6.75	8.17	8.70	9.23
1919	9.13	8.12	7.63	6.62	7.20	6.83	7.07	7.33	7.50	7.30	7.75	8.50
1920	7.33	6.94	6.75	5.24	5.24	....	....	....	....	....	....	....

[1] Price reduced to quart basis as reported in various issues of Milk Reporter and by letter from publishers. Milk Exchange prices prior to 1916. Dairymen's League schedule since 1916. Early prices net to produce at country stations having a freight rate of 26 cents per 40 qt. can. Recent prices net to producer at 151 to 160 mile zone. Calculated to 3.7 per cent fat when fat was recognized in prices. New York prices are now quoted regularly for 3.0 per cent milk at the 200 to 210 mile zone.

Wholesale Milk Prices—Continued

New York Relative [1]	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1899	84	76	76	68	64	61	66	68	76	87	99	99
1900	91	91	84	76	70	68	74	80	84	91	91	99
1901	91	84	80	76	64	61	68	72	76	84	94	106
1902	103	99	92	87	80	68	68	74	76	91	99	114
1903	106	106	101	95	81	72	68	68	78	86	91	99
1904	95	91	91	84	72	61	63	68	76	87	101	114
1905	106	103	95	86	78	61	72	76	84	91	96	106
1906	106	104	95	87	78	68	71	81	88	99	106	114
1907	114	106	99	99	87	76	80	94	103	122	122	122
1908	122	114	106	95	80	69	76	91	95	114	116	122
1909	119	110	106	95	81	68	84	95	106	114	123	129
1910	125	122	114	109	91	91	190	106	114	122	122	129
1911	119	114	99	87	84	76	87	95	99	114	124	129
1912	129	125	114	106	99	91	99	106	106	114	122	129
1913	114	114	106	101	91	84	91	106	114	122	123	123
1914	122	114	106	99	81	84	91	99	106	122	129	129
1915	125	119	114	99	84	84	91	99	106	114	129	129
1916	125	122	114	99	91	84	95	106	111	152	159	159
1917	156	152	149	148	145	138	151	181	181	218	234	218
1918	245	234	226	179	177	134	163	192	205	248	264	280
1919	277	247	232	201	219	207	215	223	228	222	235	258
1920	223	211	205	159	159	...	...	...	...	...	...	...

[1] Base = 100 = Average monthly prices 1904 to 1913, inclusive.

Wholesale Milk Prices—Continued

Detroit [1]	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$1.85	$1.85	$1.60	$1.35	$1.25	$1.20	$1.30	$1.50	$1.60	$1.80	$1.80	$1.90
1914	1.85	1.85	1.80	1.35	1.20	1.15	1.40	1.50	1.60	1.80	1.80	1.90
1915	1.85	1.85	1.80	1.35	1.20	1.15	1.40	1.50	1.60	1.80	1.80	1.90
1916	1.70	1.70	1.70	1.35	1.25	1.20	1.50	1.80	1.80	2.00	2.00	2.10
1917	2.45	2.25	2.15	1.75	1.40	1.40	2.15	2.50	2.50	2.50	2.50	3.35
1918	3.35	3.29	3.21	2.74	2.36	2.16	2.56	3.10	3.40	3.40	3.55	4.00
1919	3.62	3.52	3.15	3.04	3.07	2.92	3.22	3.87	3.87	3.87	3.87	3.87
Baltimore [2]												
1913	$2.20	$2.20	$2.20	$1.86	$1.86	$1.86	$1.86	$1.86	$2.09	$2.32	$2.32	$2.32
1914	2.20	2.20	2.20	1.86	1.86	1.86	1.86	1.86	2.20	2.32	2.32	2.32
1915	2.20	2.20	2.20	1.97	1.86	1.86	1.86	1.86	2.20	2.32	2.32	2.32
1916	2.20	2.20	2.20	1.97	1.86	1.86	1.86	1.86	2.20	2.44	2.44	2.44
1917	2.32	2.32	2.32	2.32	2.67	2.67	2.67	2.90	3.25	3.25	3.36	3.48
1918	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	4.48	4.64	4.87	4.87
1919	4.64	4.41	3.71	3.71	3.71	3.48	3.48	3.95	4.41	4.41	4.64	4.64

[1] Price in first freight zone, cwt.

[2] Four per cent milk, cwt.

Wholesale Milk Prices—Continued

New York [1]	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$1.75	$1.74	$1.63	$1.55	$1.40	$1.28	$1.40	$1.63	$1.75	$1.86	$1.88	$1.88
1914	1.86	1.75	1.63	1.51	1.24	1.28	1.40	1.51	1.63	1.86	1.98	1.98
1915	1.92	1.83	1.75	1.51	1.28	1.28	1.40	1.51	1.63	1.75	1.98	1.98
1916	1.92	1.86	1.75	1.51	1.40	1.28	1.45	1.63	1.70	2.33	2.43	2.43
1917	2.39	2.33	2.28	2.27	2.22	2.12	2.32	2.77	2.77	3.34	3.59	3.34
1918	3.76	3.58	3.47	2.75	2.71	2.06	2.50	2.94	3.14	3.80	4.05	4.30
1919	4.25	3.78	3.55	3.08	3.35	3.18	3.29	3.41	3.49	3.40	3.60	3.96
Relative [2]												
1913	106	106	99	94	85	78	85	99	106	113	114	114
1914	113	106	99	92	75	78	85	92	99	113	120	120
1915	117	111	106	92	78	78	85	92	99	106	120	120
1916	117	113	106	92	85	78	88	99	103	142	148	147
1917	145	142	139	138	135	139	141	168	168	203	218	203
1918	228	218	211	167	165	125	153	179	191	231	246	261
1919	258	230	216	188	204	193	200	207	212	207	219	241

[1] Based on same data as prices in other New York price table, calculated to hundredweight basis.

[2] Base=100=Average, 1913.

Wholesale Milk Prices—Continued

Bucyrus, O.	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$1.86	$1.86	$1.86	$1.63	$1.63	$1.63	$1.63	$1.63	$1.63	$1.86	$1.86	$1.86
1914	1.86	1.86	1.86	1.63	1.63	1.63	1.63	1.63	1.63	1.86	1.86	1.86
1915	1.86	1.86	1.86	1.63	1.63	1.63	1.63	1.86	1.86	1.86	1.86	1.86
1916	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
1917	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	2.75	2.75	2.75	2.75
1918	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	3.00	3.00	3.00	3.25
1919	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.00	3.00	3.00	3.25
Toledo, O.[1]												
1913	$1.95	$1.85	$1.70	$1.45	$1.30	$1.30	$1.35	$1.35	$1.55	$1.75	$1.85	$1.95
1914	2.00	1.90	1.70	1.45	1.30	1.20	1.35	1.40	1.50	1.75	1.75	1.75
1915	1.75	1.75	1.65	1.35	1.25	1.25	1.30	1.30	1.40	1.55	1.70	1.80
1916	1.80	1.80	1.65	1.45	1.30	1.30	1.60	1.60	1.70	2.00	2.00	2.20
1917	2.20	2.20	2.20	2.20	2.15	2.20	2.30	2.45	2.75	3.20	3.20	3.20
1918	3.20	3.07	2.75	2.00	1.85	1.85	2.30	2.75	3.00	3.35	3.65	3.75
1919	3.72	3.72	3.00	2.75	2.50	2.50	3.00	3.52	3.55	3.65	3.65	3.65

[1] Prices per cwt. at Morenci, Mich., for milk testing about 3.5 per cent fat.

Wholesale Milk Prices—Continued

Springfield, Ohio [1]	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$1.63	$1.63	$1.63	$1.63	$1.63	$1.63	$1.63	$1.63	$1.63	$1.63	$1.63	$1.63
1914	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
1915	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
1916	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	2.09
1917	2.09	2.09	2.09	2.09	1.86	1.86	1.86	2.09	2.33	2.33	2.79	2.91
1918	2.73	3.31	3.08	2.79	2.33	2.33	2.56	3.08	3.08	3.26	3.50	3.90
1919	3.72	3.32	3.02	3.02	2.91	2.91	3.08	3.37	3.37	3.37	3.72	3.87
Portland, Oregon [2]												
1913	$2.21	$2.16	$2.09	$1.93	$1.83	$1.96	$2.00	$2.09	$2.14	$2.14	$2.22	$2.26
1914	2.23	2.11	2.05	1.90	1.78	1.83	1.83	1.83	1.83	2.09	2.12	2.09
1915	1.99	1.92	1.88	1.70	1.65	1.69	1.72	1.82	1.92	1.96	1.97	2.31
1916	2.07	2.05	1.97	1.82	1.76	1.77	1.92	1.98	2.01	2.07	2.22	2.30
1917	2.29	2.26	2.29	2.27	1.88	2.05	2.50	2.75	2.75	2.75	2.87	3.00
1918	....	3.00	3.00	3.00	3.00	3.00	3.35	3.35	3.35	3.85	3.85	3.85
1919	3.85	3.85	3.20	3.00	3.00	3.00	3.50	3.50	3.50	3.90	3.90	3.90

[1] 4 per cent fat, F. O. B. City.

[2] 3.8 per cent fat, F. O. B. City.

Wholesale Milk Prices—Continued

Columbus, Ohio [1]	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1910	....	....	....	....	....	....	$1.51	$1.51	$1.63	$1.69	$1.69	$1.74
1911	$1.74	$1.74	$1.74	$1.74	$1.47	$1.41	1.48	1.50	1.70	1.75	1.75	1.75
1912	1.75	1.75	1.75	1.75	1.67	1.63	1.58	1.64	1.90	1.92	1.93	1.96
1913	1.95	1.95	2.00	2.00	1.48	1.75	1.75	1.75	2.05	2.05	2.05	2.05
1914	2.05	2.05	2.05	2.05	1.65	1.65	1.65	1.65	1.95	1.95	1.95	1.95
1915	1.95	1.95	1.95	1.95	1.60	1.60	1.60	1.60	1.90	1.90	1.90	1.90
1916	1.90	1.90	1.90	1.90	1.60	1.60	1.65	1.65	1.95	1.95	1.95	1.95
1917	2.20	2.20	2.20	2.20	2.40	2.42	2.37	2.45	2.58	2.86	3.00	3.30
1918	3.45	3.60	3.60	3.00	2.80	2.80	2.80	3.40	3.60	3.60	4.00	4.25
1919	4.05	3.82	3.80	3.80	3.30	3.30	3.80	3.80	3.80	3.80	4.25	4.50
1920	4.50	4.25	4.00	....	....	....	....	....	....	....	....	....

[1] 4.0 per cent fat, F. O. B. City.

Wholesale Milk Prices—Continued

Cleveland, Ohio [1]	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1908	....	$1.50	$1.50	$1.15	$ .83	$ .76	$ .87	$1.00	$1.14	$1.40	$1.50	$1.50
1909	$1.47	1.41	1.30	1.15	.95	.90	1.05	1.20	1.35	1.50	1.50	1.50
1910	1.50	1.50	1.44	1.32	1.12	1.10	1.20	1.35	1.50	1.60	1.55	1.50
1911	1.48	1.32	1.22	1.10	.96	.94	1.15	1.28	1.37	1.50	1.54	1.60
1912	1.60	1.50	1.50	1.40	1.21	1.10	1.29	1.35	1.47	1.65	1.75	1.75
1913	1.75	1.75	1.60	1.45	1.24	1.20	1.30	1.40	1.50	1.60	1.70	1.70
1914	1.70	1.70	1.60	1.35	1.10	1.00	1.25	1.35	1.45	1.50	1.70	1.70
1915	1.70	1.55	1.50	1.30	1.10	1.10	1.20	1.30	1.40	1.60	1.70	1.70
1916	1.70	1.70	1.70	1.40	1.20	1.20	1.35	1.45	1.70	2.00	2.00	2.00
1917	2.25	2.25	2.25	2.00	1.70	1.70	1.95	2.60	2.60	2.60	2.85	3.05
1918	3.15	3.25	3.00	2.80	2.25	2.00	2.15	3.00	3.13	3.25	3.50	3.75
1919	3.63	3.25	2.80	2.70	2.60	2.60	3.12	3.30	3.40	3.60	3.72	3.80

[1] Price at Wellington and other country stations taking same freight rate, 3.3–3.7 per cent milk.

Wholesale Milk Prices—Continued

Minerva, Ohio [1]	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1915	....	....	....	....	$1.25	$1.25	$1.30	$1.30	$1.40	$1.60	$1.70	$1.85
1916	$1.85	$1.85	$1.65	$1.50	1.35	1.30	1.45	1.45	1.65	2.00	2.15	2.20
1917	2.20	2.20	2.15	2.30	2.25	2.25	2.35	2.50	2.75	3.10	3.20	3.20
1918	3.20	3.20	2.95	2.65	2.25	1.90	2.25	2.75	3.00	3.35	3.65	3.80
1919	3.80	3.50	2.90	2.75	2.75	3.15	3.45	3.55	3.65	3.65	3.65	3.80
Marion, Ohio												
1915	$1.80	$1.80	$1.60	$1.60	$1.30	$1.30	$1.40	$1.40	$1.60	$1.60	$1.85	$1.85
1916	2.00	2.00	1.80	1.80	1.40	1.40	1.60	1.60	1.80	1.80	2.00	2.00
1917	2.00	2.00	2.00	2.00	1.70	2.10	2.35	2.35	2.45	2.65	2.85	3.10
1918	3.10	3.10	3.00	3.00	2.20	2.20	2.40	2.50	3.25	3.49	3.60	3.60
1919	3.60	3.40	3.20	3.20	2.70	2.70	3.00	3.00	3.20	3.70	4.00	4.00

[1] 3.5 per cent milk at condensery.

Wholesale Milk Prices—Continued

Chicago [1]	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$2.11	$2.03	$1.96	$1.96	$1.60	$1.53	$1.89	$1.96	$1.96	$2.11	$2.40	$2.40
1914	2.25	2.18	2.11	1.82	1.60	1.53	1.89	1.96	1.96	2.25	2.25	2.25
1915	2.25	2.25	2.25	1.74	1.45	1.45	1.96	2.04	2.04	2.03	2.18	2.18
1916	2.11	2.04	1.89	1.96	1.82	1.60	1.89	2.04	2.04	2.03	2.47	2.47
1917	2.33	2.25	2.11	2.76	2.33	1.89	2.44	2.62	2.62	3.69	3.49	3.49
1918	3.49	3.36	3.20	2.95	2.37	2.14	1.99	3.15	3.31	3.71	4.06	4.14
1919	4.13	3.88	3.42	3.20	2.91	2.91	3.42	3.93	4.00	4.07	4.00	4.00

Relative Average Wholesale Prices of "All Commodities"

United States [2]	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	102	101	101	100	99	99	99	100	101	101	101	97
1914	99	99	98	97	96	96	96	100	100	98	97	97
1915	99	99	99	99	99	99	101	101	101	103	105	109
1916	113	116	119	121	121	120	121	123	125	130	139	142
1917	146	149	154	168	176	180	186	184	183	179	180	176
1918	182	184	185	188	187	186	190	193	198	198	198	200
1919	203	197	201	203	207	207	218	226	220	223	230	238

[1] Can prices F. O. B. Chicago. Freight prepaid by producer. Includes 15 cents can charge. (Eight gallon can.)

[2] Based on War Indus. Bul. No. 3, p. 7, relative prices of 1371 commodities for 1913 to 1918 and on Bureau of Labor statistics figure for 1919. Recalculated: 100 = Average, 1913.

Retail Milk Prices

Average Ten [1] *Cities*	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$.087	$.087	$.086	$.086	$.085	$.085	$.085	$.085	$.085	$.086	$.087	$.087
1914	.087	.086	.087	.086	.086	.086	.086	.085	.085	.086	.087	.087
1915	.087	.086	.086	.085	.085	.085	.085	.085	.085	.086	.085	.086
1916	.086	.086	.086	.085	.085	.085	.086	.088	.088	.092	.096	.096
1917	.098	.099	.099	.098	.100	.101	.105	.111	.114	.122	.124	.126
1918	.131	.131	.131	.127	.124	.124	.124	.129	.139	.143	.150	.150
1919	.149	.147	.141	.140	.140	.141	.144	.150	.150	.154	.157	.158
1920	.158	.157	.155	....	....	....	....	....	....	....	....	....
Relative [2] *Price*												
1913	102	102	100	100	99	99	98	98	99	100	101	101
1914	101	101	101	100	100	100	100	99	99	101	101	101
1915	101	101	100	99	99	99	99	99	99	100	100	100
1916	100	100	100	99	99	99	100	103	102	107	111	112
1917	114	115	115	114	116	118	122	129	133	142	144	147
1918	153	152	152	147	144	144	144	150	162	167	175	175
1919	174	171	164	163	163	164	167	174	174	180	183	184
1920	164	183	180	...	...	...	...	...	...	...	...	...

[1] Milwaukee, Chicago, New Orleans, Pittsburg, Philadelphia, San Francisco, Detroit, Baltimore, New York, Cleveland.
[2] Base = 100 = Average, 1913.

Retail Milk Prices—Continued

Average for U. S.[1]	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09
1914	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
1915	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
1916	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.10	.10
1917	.10	.10	.10	.10	.10	.11	.11	.11	.12	.13	.13	.13
1918	.13	.13	.13	.13	.13	.13	.13	.14	.14	.15	.15	.15
1919	.16	.16	.15	.15	.15	.15	.15	.16	.16	.16	.16	.17
1920	.17	.17	.17	...	...	...	...	...	...	...	...	...

[1] U. S. Bureau of Labor Statistics by months.

Retail Milk Prices—Continued

Milwaukee	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$.07	$.07	$.07	$.07	$.07	$.07	$.07	$.07	$.07	$.07	$.07	$.07
1914	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07
1915	.07	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06
1916	.06	.06	.06	.06	.06	.06	.07	.07	.07	.07	.08	.08
1917	.08	.08	.08	.08	.08	.08	.09	.09	.09	.11	.11	.11
1918	.11	.11	.11	.10	.10	.10	.10	.11	.12	.12	.13	.13
1919	.13	.13	.12	.12	.12	.12	.12	.13	.13	.13	.13	.13
1920	.13	.13	.12	...	...	...	...	...	...	...	...	...
Relative [1]												
1913	100	100	100	100	100	100	100	100	100	100	100	100
1914	100	100	100	100	100	100	100	100	100	100	100	100
1915	100	86	86	86	86	86	86	86	86	86	86	86
1916	86	86	86	86	86	86	100	100	100	100	114	114
1917	114	114	114	114	114	114	129	129	129	157	157	157
1918	157	157	157	143	143	149	143	157	171	171	186	186
1919	186	186	171	171	171	171	171	186	186	186	186	186
1920	186	186	171	...	...	...	...	...	...	...	...	...

[1] Base = 100 = Average, 1913.

Retail Milk Prices—Continued

Chicago	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$.08	$.08	$.08	$.08	$.08	$.08	$.08	$.08	$.08	$.08	$.08	$.08
1914	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08
1915	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08
1916	.08	.08	.08	.08	.08	.08	.08	.09	.09	.09	.09	.09
1917	.09	.09	.09	.10	.10	.10	.10	.10	.10	.13	.12	.12
1918	.12	.12	.12	.12	.12	.12	.12	.12	.13	.13	.14	.14
1919	.14	.14	.13	.13	.13	.14	.14	.15	.15	.15	.15	.15
1920	.15	.15	.14	...	...	...	...	...	...	...	...	...
San Francisco												
1913	$.10	$.10	$.10	$.10	$.10	$.10	$.10	$.10	$.10	$.10	$.10	$.10
1914	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
1915	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
1916	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
1917	.10	.10	.10	.10	.10	.10	.10	.10	.12	.12	.12	.12
1918	.12	.12	.12	.12	.12	.12	.12	.12	.14	.14	.14	.14
1919	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.15	.15
1920	.16	.16	.16	...	...	...	...	...	...	...	...	...

Retail Milk Prices—Continued

New Orleans	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$.10	$.10	$.10	$.10	$.10	$.10	$.09	$.09	$.10	$.09	$.10	$.10
1914	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
1915	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
1916	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.12	.12
1917	.12	.11	.12	.10	.10	.11	.12	.12	.12	.13	.14	.14
1918	.14	.14	.14	.14	.14	.14	.14	.14	.15	.16	.16	.16
1919	.16	.16	.16	.16	.17	.16	.17	.16	.16	.18	.19	.18
1920	.19	.18	.19	...	...	...	...	...	...	...	...	...
Relative [1]												
1913	102	102	102	102	102	102	95	95	97	97	100	100
1914	99	99	99	99	99	99	99	99	99	100	100	100
1915	102	102	102	102	102	102	102	102	102	102	100	100
1916	100	100	100	102	102	102	102	102	102	102	119	122
1917	118	118	118	102	98	115	119	119	119	135	139	141
1918	145	146	146	145	146	145	145	145	146	161	164	164
1919	167	166	164	164	169	169	169	169	164	189	189	189
1920	189	189	189	...	...	...	...	...	...	...	...	...

[1] Base = 100 = Average, 1913.

Retail Milk Prices—Continued

Pittsburgh	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09
1914	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
1915	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
1916	.09	.09	.09	.09	.09	.09	.09	.09	.09	.10	.10	.10
1917	.10	.10	.10	.10	.10	.10	.10	.12	.12	.13	.13	.13
1918	.14	.14	.14	.13	.13	.12	.13	.13	.14	.14	.15	.15
1919	.15	.15	.14	.14	.14	.13	.14	.15	.15	.16	.16	.16
1920	.16	.16	.16	...	...	...	...	...	...	...	...	...
Relative [1]												
1913	100	100	100	100	98	98	98	98	98	100	105	105
1914	105	105	105	105	105	105	102	103	102	103	106	106
1915	106	106	106	106	106	106	106	106	106	106	106	106
1916	106	106	106	106	106	106	106	106	106	112	117	117
1917	117	117	117	117	117	117	117	140	142	142	145	145
1918	156	157	154	154	142	142	146	148	159	159	171	171
1919	171	171	159	159	163	151	163	174	171	182	182	182
1920	182	182	182	...	...	...	...	...	...	...	...	...

[1] Base = 100 = Average, 1913.

Retail Milk Prices—Continued

Philadelphia	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$.08	$.08	$.08	$.08	$.08	$.08	$.08	$.08	$.08	$.08	$.08	$.08
1914	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08
1915	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08
1916	.08	.08	.08	.08	.08	.08	.08	.08	.08	.09	.09	.09
1917	.09	.09	.09	.09	.09	.09	.11	.11	.11	.11	.12	.12
1918	.13	.13	.13	.12	.12	.12	.12	.12	.13	.14	.14	.14
1919	.14	.14	.13	.13	.13	.13	.13	.14	.14	.14	.14	.14
1920	.14	.14	.14	...	...	...	...	...	...	...	...	...
Relative [1]												
1913	100	100	100	100	100	100	100	100	100	100	100	100
1914	100	100	100	100	100	100	100	100	100	100	100	100
1915	100	100	100	100	100	100	100	100	100	100	100	100
1916	100	100	100	100	100	100	100	100	100	106	110	110
1917	113	112	113	112	113	112	138	137	138	137	153	152
1918	169	163	165	150	150	150	150	150	162	175	175	175
1919	175	175	163	162	163	162	163	175	175	175	175	175
1920	175	175	175	....	...	...	...	...	...	...	...	...

[1] Base = 100 = Average, 1913.

Retail Milk Prices—Continued

Detroit	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$.09	$.09	$.08	$.08	$.08	$.08	$.08	$.08	$.08	$.09	$.09	$.09
1914	.09	.09	.09	.08	.08	.08	.08	.08	.08	.09	.09	.09
1915	.09	.09	.09	.08	.08	.08	.08	.08	.08	.09	.09	.09
1916	.09	.09	.09	.08	.08	.08	.08	.09	.09	.10	.10	.10
1917	.11	.11	.11	.11	.11	.11	.11	.12	.12	.12	.12	.14
1918	.14	.14	.14	.13	.12	.12	.13	.14	.15	.15	.15	.15
1919	.15	.15	.15	.15	.15	.15	.15	.16	.16	.16	.16	.16
1920	.16	.16	.16	...	...	...	...	...	...	...	...	...
Baltimore												
1913	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09
1914	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
1915	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
1916	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
1917	.09	.09	.09	.09	.11	.11	.11	.11	.12	.12	.12	.13
1918	.13	.13	.13	.13	.13	.13	.13	.13	.16	.16	.17	.17
1919	.17	.16	.15	.14	.14	.14	.14	.15	.16	.16	.16	.16
1920	.16	.16	.16									

Retail Milk Prices—Continued

New York	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09	$.09
1914	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
1915	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09
1916	.09	.09	.09	.09	.09	.09	.09	.09	.09	.10	.10	.10
1917	.10	.10	.10	.10	.10	.10	.11	.13	.12	.14	.14	.14
1918	.15	.15	.15	.14	.13	.13	.13	.14	.14	.16	.17	.17
1919	.16	.16	.16	.15	.16	.15	.16	.16	.16	.16	.17	.18
1920	.18	.17	.17	...	...	...	...	...	...	...	...	...
Relative [1]												
1913	100	100	100	100	100	100	100	100	100	100	100	100
1914	100	100	100	100	100	100	100	100	100	100	100	100
1915	100	102	100	100	100	100	100	100	100	100	100	100
1916	100	100	100	100	100	100	100	100	100	109	109	110
1917	111	121	121	121	121	121	127	139	138	133	156	156
1918	167	162	162	156	144	142	141	156	156	173	190	190
1919	179	179	172	172	175	167	178	178	179	179	197	200
1920	200	186	186	...	...	...	...	...	...	...	...	...

[1] Base = 100 = Average, 1913.

Retail Milk Prices—Continued

Cleveland	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1910	$.08	$.08	$.08	$.08	$.08	$.08	$.08	$.08	$.08	$.08	$.08	$.08
1911	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08
1912	.08	.08	.08	.08	.08	.08	.08	.08	.08	.09	.09	.09
1913	.09	.09	.09	.08	.08	.08	.08	.08	.08	.08	.08	.08
1914	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08
1915	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08
1916	.08	.08	.08	.08	.08	.08	.08	.08	.08	.09	.09	.09
1917	.10	.10	.10	.10	.10	.10	.10	.12	.12	.12	.12	.12
1918	.13	.13	.13	.13	.13	.13	.13	.13	.14	.14	.15	.15
1919	.15	.14	.13	.13	.13	.14	.15	.15	.15	.16	.16	.16
1920	.16	.16	.16	...	...	...	...	...	...	...	...	...

Relative Retail Prices of Round Steak [1]

United States	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	92	93	96	99	100	101	104	104	104	104	102	101
1914	102	102	103	103	105	106	109	113	110	107	105	103
1915	102	100	99	100	103	105	107	107	106	104	102	101
1916	102	102	104	108	112	117	116	115	115	111	108	107
1917	111	117	119	130	133	135	137	138	133	138	133	134
1918	137	141	143	155	170	182	181	178	178	175	173	171
1919	175	174	177	182	187	181	183	177	170	165	162	161

[1] U. S. Bureau of Labor Statistics, Mo. Bul., March, 1920, p. 36. Base = 100 = Average, 1913.

Relative Retail Prices of 22 Foods [1]

United States	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1913	98	97	97	98	97	98	100	101	102	104	105	104
1914	104	101	99	97	98	99	102	107	107	105	105	105
1915	103	101	98	99	100	100	100	100	101	103	104	105
1916	107	106	107	109	109	112	111	113	118	121	126	126
1917	128	133	133	145	151	152	146	149	153	157	155	157
1918	160	161	154	154	158	162	167	171	178	181	183	187
1919	185	172	175	182	185	184	190	192	189	188	192	197

[1] U. S. Bureau Labor Statistics, Mo. Bul., March, 1920, p. 36. Base = 100 = Average, 1913.

Average Monthly Prices of New York Butter [1]

Wholesale Prices	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1899	$.20	$.21	$.21	$.20	$.18	$.19	$.18	$.20	$.23	$.24	$.26	$.27
1900	.26	.25	.25	.20	.20	.19	.20	.21	.22	.21	.26	.25
1901	.23	.22	.22	.21	.19	.20	.20	.20	.21	.22	.24	.25
1902	.24	.28	.28	.29	.23	.22	.21	.20	.22	.24	.27	.29
1903	.27	.26	.29	.27	.22	.22	.20	.19	.21	.21	.23	.24
1904	.23	.25	.25	.23	.20	.18	.18	.18	.19	.21	.25	.27
1905	.29	.32	.28	.30	.24	.20	.21	.21	.21	.22	.24	.24
1906	.26	.27	.27	.22	.20	.20	.21	.23	.25	.26	.28	.32
1907	.31	.33	.31	.31	.25	.24	.25	.26	.28	.29	.28	.29
1908	.31	.33	.28	.29	.24	.23	.22	.23	.24	.27	.30	.31
1909	.32	.30	.30	.27	.27	.26	.26	.27	.30	.31	.31	.35
1910	.33	.30	.33	.31	.28	.28	.28	.29	.30	.30	.31	.30
1911	.27	.26	.24	.21	.22	.23	.25	.26	.27	.30	.34	.37
1912	.38	.31	.31	.32	.30	.27	.27	.27	.30	.31	.34	.37
1913	.35	.36	.37	.35	.29	.28	.27	.30	.32	.31	.34	.36
1914	.33	.29	.28	.25	.26	.27	.28	.30	.31	.32	.35	.34
1915	.34	.32	.30	.31	.29	.28	.27	.26	.27	.29	.31	.35
1916	.33	.34	.37	.36	.31	.30	.29	.31	.34	.35	.39	.40
1917	.40	.44	.42	.44	.40	.39	.39	.41	.44	.45	.46	.49
1918	.52	.51	.45	.43	.45	.44	.45	.46	.56	.59	.63	.69
1919	.62	.52	.62	.65	.58	.52	.53	.55	.59	.67	.71	.72
1920	.67	.67	.66	.71	...	...	...	...	...	...	...	...

[1] New York Butter extras from Milk Reporter, various issues. Relative on base: 100 = average, 1904–1913.

Average Monthly Prices of New York Butter—Continued

Relative [1]	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1899	72	76	76	71	65	68	66	73	83	87	94	99
1900	95	91	91	71	73	70	71	76	79	77	94	91
1901	83	82	80	76	69	71	72	74	76	80	87	91
1902	88	103	103	105	83	80	77	72	78	87	97	106
1903	99	96	103	97	80	79	73	70	75	77	84	88
1904	82	92	89	83	73	65	64	65	71	76	91	98
1905	106	117	102	109	86	74	75	77	75	79	86	88
1906	96	98	98	79	73	73	75	82	89	95	100	115
1907	112	118	111	111	91	85	91	93	103	106	101	107
1908	111	120	103	104	86	85	81	83	87	97	107	114
1909	114	109	107	98	97	94	95	99	109	111	112	126
1910	121	108	119	113	103	101	103	107	109	109	113	108
1911	96	95	87	77	79	83	91	96	96	110	123	134
1912	138	113	111	117	110	99	99	97	108	114	125	135
1913	128	132	134	126	104	101	98	109	115	114	123	131
1914	119	106	101	92	95	99	101	111	114	115	126	123
1915	122	117	108	112	105	103	98	94	97	104	113	127
1916	119	123	134	131	113	108	105	113	123	129	143	145
1917	146	158	151	161	146	142	142	150	161	162	165	180
1918	190	186	162	157	165	160	163	167	203	213	230	249
1919	225	188	224	234	211	190	192	201	214	245	258	263
1920	242	242	241	259	...	...	...	...	...	...	...	...

[1] Base = 100 = Average, 1913.

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